A. M. A.
SCIENTIFIC EXHIBITS
1957

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PREFACE

The Council on Scientific Assembly takes pride in presenting this new volume of "A.M.A. SCIENTIFIC EXHIBITS 1957." The interest shown in the volumes for 1955 and 1956 was outstanding and it is felt that the 1957 volume will be in even greater demand. The Scientific Exhibit at the New York Meeting was a real contribution to graduate medical education. The physician-to-physician contact made it an ideal teaching arrangement in which Mark Hopkins would have gloried. Authors of exhibits contributed unsparingly of their time, energy and finances in the preparation of their displays and at the meeting they spent long hours every day of the week in demonstrations. Medicine is indeed indebted to such eleemosynary endeavors.

The Scientific Exhibit at New York included some 400 exhibits besides various conferences, many of which could not be included in this volume because of lack of space. The Editorial Committee selected exhibits which received awards together with the "runners up" on the award list. It is regretted that some 300 exhibits were omitted from the selection because it was impossible to reproduce them all. Their omission in no way discredits their worthiness.

Following the precedent established last year, there is included a section drawn from the commercial exhibits of the Technical Exposition. These are carried as advertising, the same as advertising is carried in medical journals, but stressing educational aspects. The Technical Exposition is an integral part of the American Medical Association meeting and many physicians find it a source of information on new products.

The Council on Scientific Assembly commends the staff of Grune & Stratton for their untiring efforts in publishing the third volume in this series. Numerous conferences were held with both Dr. Henry M. Stratton and Dr. Richard H. Orr concerning details, and the final results are a culmination of long and careful planning. Dr. Austin Smith gave much valuable advice. The cooperation of the various contributors has been excellent, and their willingness to prepare the material for publication has been a real factor in producing a unique book.

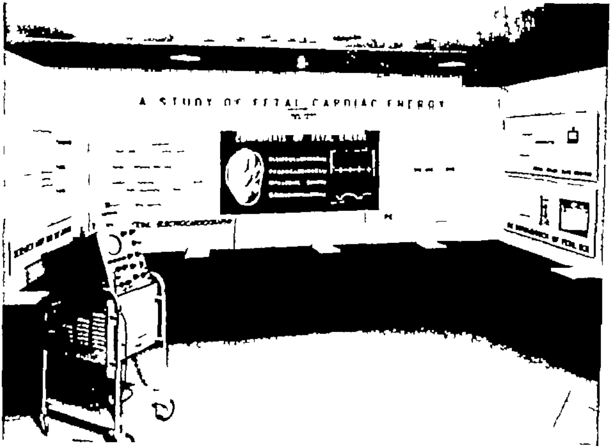
THOMAS G. HULL, *Secretary*
Council on Scientific Assembly

Certificate of Merit

PERINATAL PROBLEMS

A Study of Fetal Cardiac Energy Edward H Hon and Orvan W Hess Yale University School of Medicine New Haven Conn

The hibit outlines the importance of perinatal mortality cer bral palsy and mental retardation as major problems associated with the birth proces The possible role of fetal cardiac energy diagnostic tool in the early detection of f tal distr is presented. The instrumentation of fetal electrocardiography from the tandpoint of configuration studies and the provision of pulse for counting the fetal rate during labor i outlined graphically Some of the actual in truments used in this study are also demon trated. These includ magnetic tape recording f f tal heart beat which is being electronically counted and the instantaneous rate displayed on fetal heart beat meter Experimental results showing fetal heart rates of patients in labor and the use of fetal lectrocardiography for the detection of fetal viability are also illustrated.



how are these losses of life and health

INTERRELATED

? METABOLITES

disease and death each year in childbearing and at birth		chronic illness and handicaps in childhood	
350 000	Mothers deliver prematurely	500 000	with cerebral palsy
?	Many have complications in pregnancy labor and delivery	300 000	with epilepsy
		1,500 000	Mentally retarded
165,000	Fatal disease and defects take infant lives in the perinatal period	285 000	Born each year with congenital malformations

? FETAL ECG

? FETAL PCG

RESEARCH MUST FIND THE ANSWER

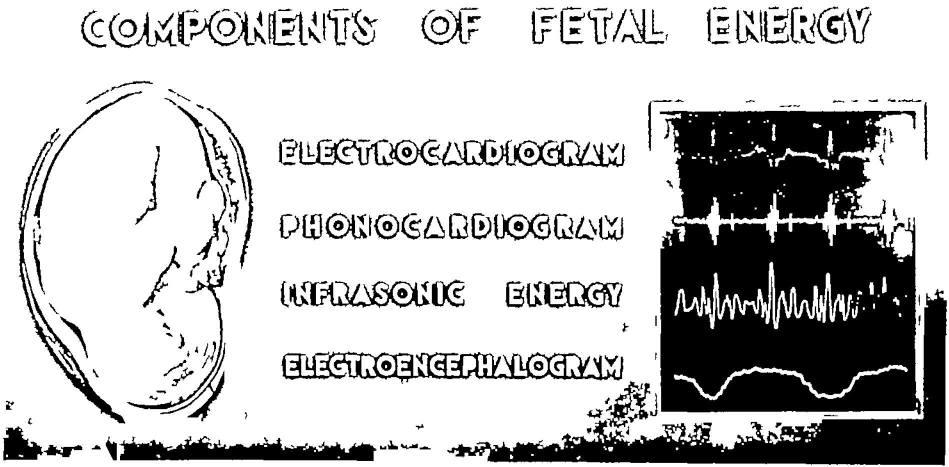
Determination of the parameters of normal fetal heart rate during the entire course of labor

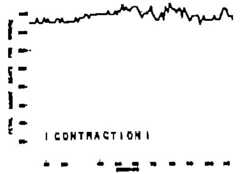
Definition of abnormal fetal heart rate and rhythm

Elucidation of variations in fetal ECG configuration and their relationship to "fetal distress"

Detection of fetal viability

? ROLE OF FETAL ELECTROCARDIOGRAPHY

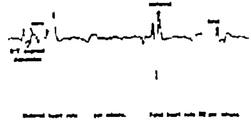

COMPONENTS OF FETAL ENERGY
ELECTROCARDIOGRAM
PHONOCARDIOGRAM
INFRASONIC ENERGY
ELECTROENCEPHALOGRAM



"Normal" fetal heart rate in early labor Primigravida, 2 cms.



Normal fetal heart rate late labor Primigravida, 7 cms

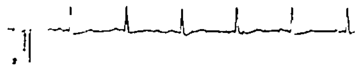


Abnormal lectrocardiogram of term fetus with ery low heart rate

THE USE OF ECG

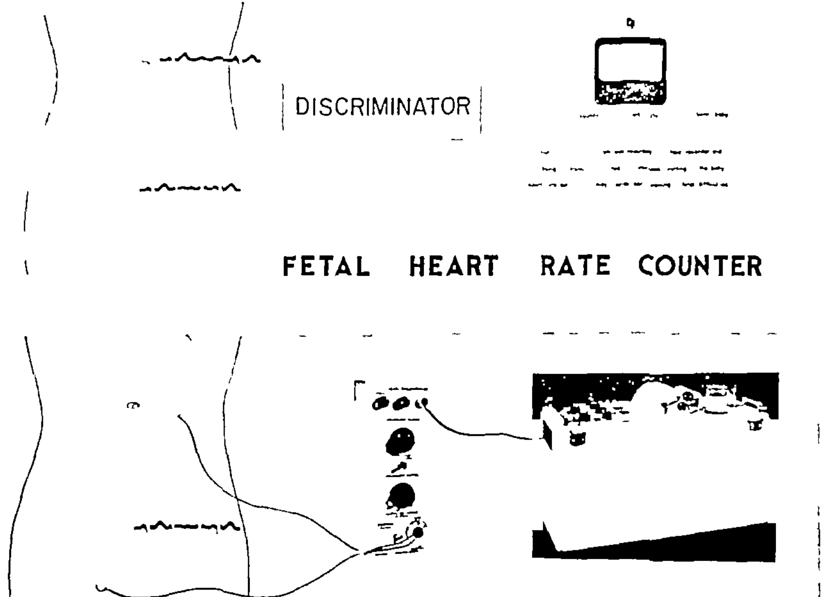


Electrocardiographic tracings from 16 week threatened abortion clinically diagnosed as "fetal death



Electrocardiographic tracing showing multiple pregnancy Maternal and both fetal ECGs apparent.

EXPERIMENTAL RESULTS



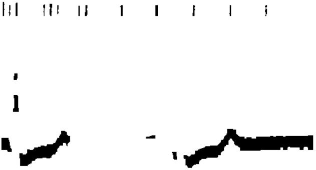
THE INSTRUMENTATION OF FETAL ECG

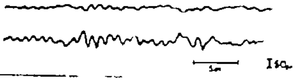
Honorable Mention

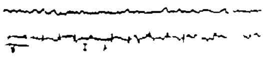
Evaluation of Intrauterine Fetal Environment: Fetal Electrocardiography and Electroencephalography Richard L. Bernstine and Winslow J. Borkowski Jefferson Medical College Hospital, Philadelphia and Edward M. Southern, Mount Sinai Hospital New York

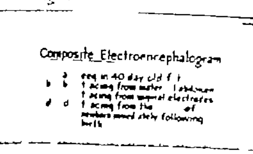
The exhibit presents the results of research on the electrical activity of the fetal heart and brain in utero. The patterns of variations resulting from the hypoxic and anoxic states in utero are demonstrated in both fetal electrocardiologic and electroencephalographic recordings. Correlative studies have included in part arterial oxygenation studies of umbilical cord blood mechanisms of death in the young fetus and in anencephalic monsters.

FETAL ELECTROCARDIOGRAPHY FETAL ELECTROENCEPHALOGRAPHY

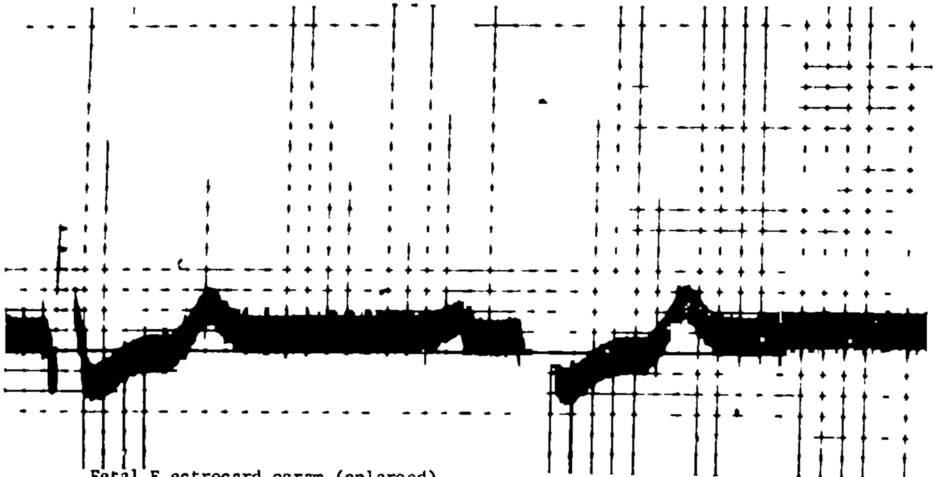






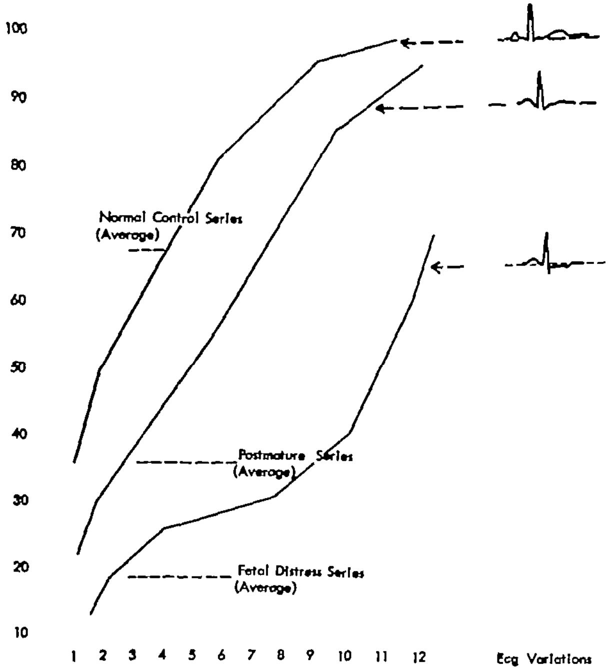


Composite Electroencephalogram



Fetal E ectrocard ogram (enlarged)

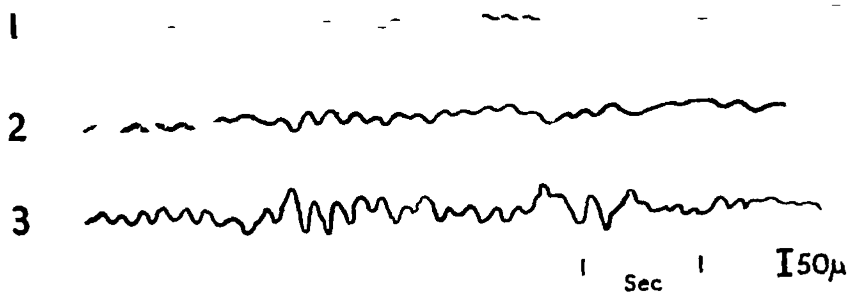
The earliest changes in the ecg pattern of the fetus in the presence of anoxia were in the S-T segments and T waves The above tracing shows depression of the S-T segment in a case of intrauterine fetal distress



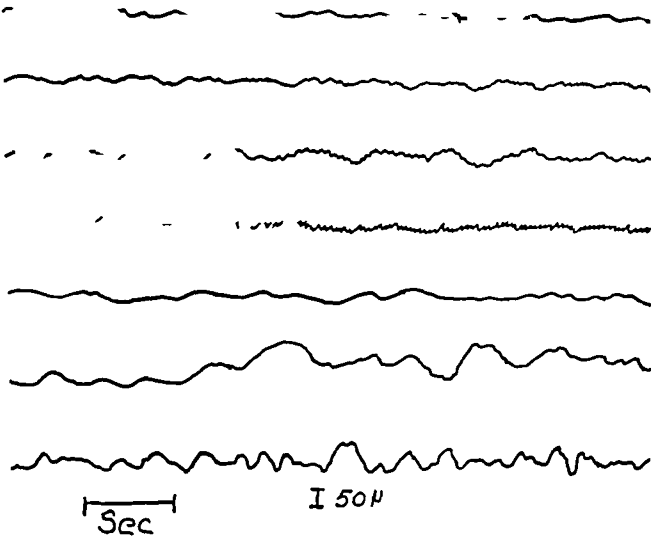
The chart correlates the percent oxygen saturation of the umbilical vein blood in the minutes following birth with the ecg pattern variations

AVERAGE ELECTROCARDIOGRAPHIC VARIATIONS LEAD 1	NORMAL VALUES	VALUES IN FETAL DISTRESS	VALUES IN POST MATURITY
Arterial Oxygen Saturation per cent (2 minutes after birth)	47 5 ± 5 1	17 1 ± 4 1	30 1 ± 3 1
Fetal Heart Rate (Beats per minute)	127	102	118
P Wave amplitude	0 05 mm	1 10 mm	0 71 mm
P – R Interval duration	0 06 sec	0 12 sec	0 09 sec
QRS Complex duration	0 02 sec	0 06 sec	0 05 sec
S – T Segment duration	0 09 sec	0 12 sec	0 11 sec
T Wave amplitude	0 03 mm	Iso-elect or	Iso-elect or
Direction of T Wave	Upright	Inverted in 35 %	Inverted in 30 %

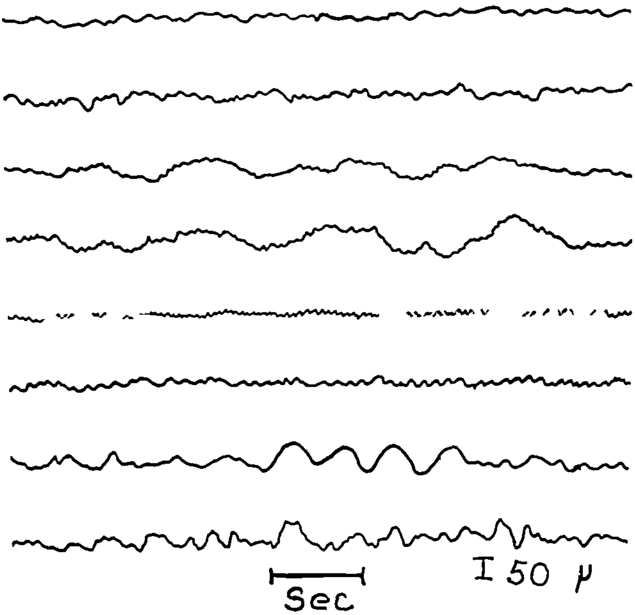
PRENATAL ELECTROCARDIOGRAPHIC VARIATIONS OF THE FETUS IN (1) NORMAL LABOR (2) FETAL DISTRESS (3) POSTMATURITY



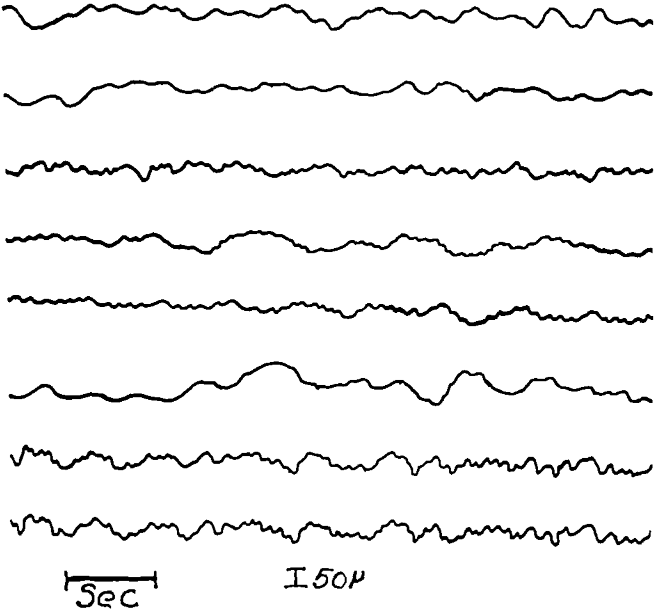
Fetal Electroencephalogram
Abnormal response to hyperventilation
1 low voltage waves at 5 per second
Following maternal hyperventilation
2 moderate build-up rhythm at 6 per second
3 very great build-up rhythm at 3 per second
Following cessation of maternal hyperventilation slow return to previous
rhythm and voltage



Fetal Electroencephalogram (vaginal leads)
The tracings represent slow waves of low voltage which are the usual pattern The last line shows high voltage slow waves which are seen following maternal hyperventilation



Fetal Electroencephalogram (abdominal leads)
The tracings represent waves of low to high voltage which occur at ½ to 18 per second These frequencies and amplitudes occur normally The last two lines show the abnormal high voltage slow waves which occur following maternal hyperventilation when the fetus is in distress Persistence of this activity is the important factor in demonstration of fetal distress

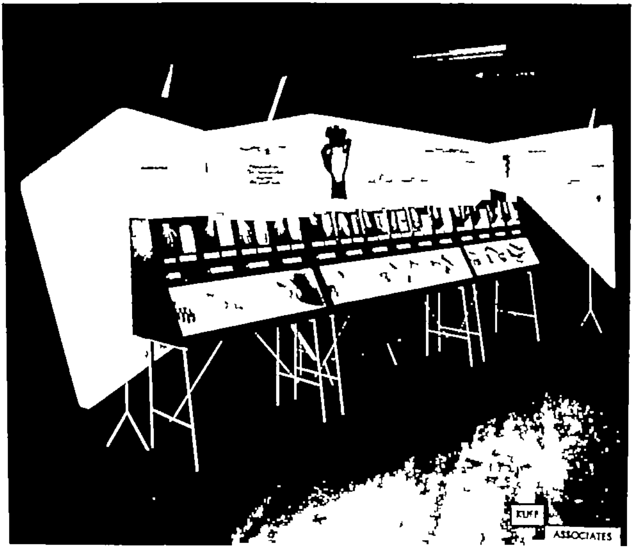


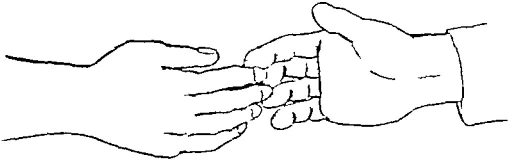
Composite Electroencephalogram
The first two lines represent eeg from a 40 day old fetus The next four lines are tracings from the intrauterine fetus via the maternal abdomen and vagina The last two lines show the eeg taken from the scalp of a newborn immediately following birth

Certificate of Merit

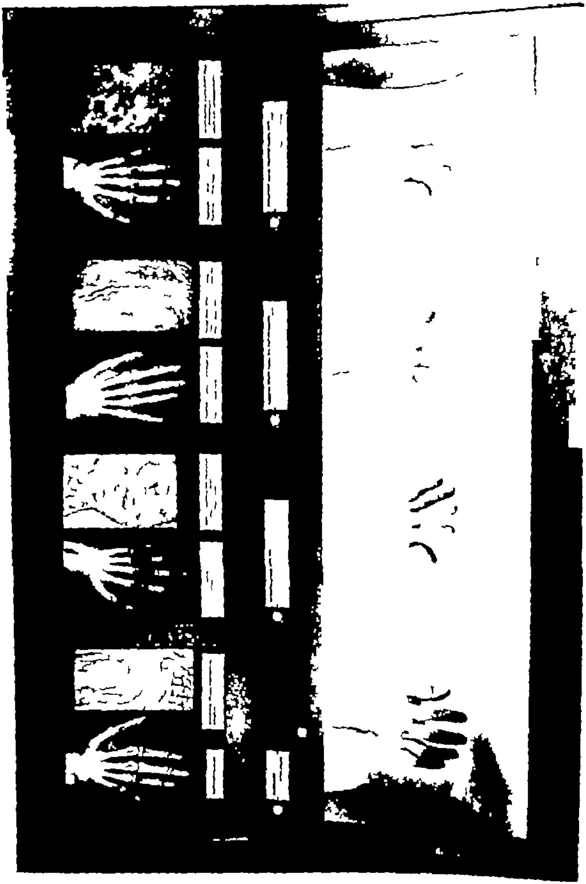
The Hands in Arthritis and Related Conditions. Darrell C. Crain, Georgetown University Hospital Washington, D C.

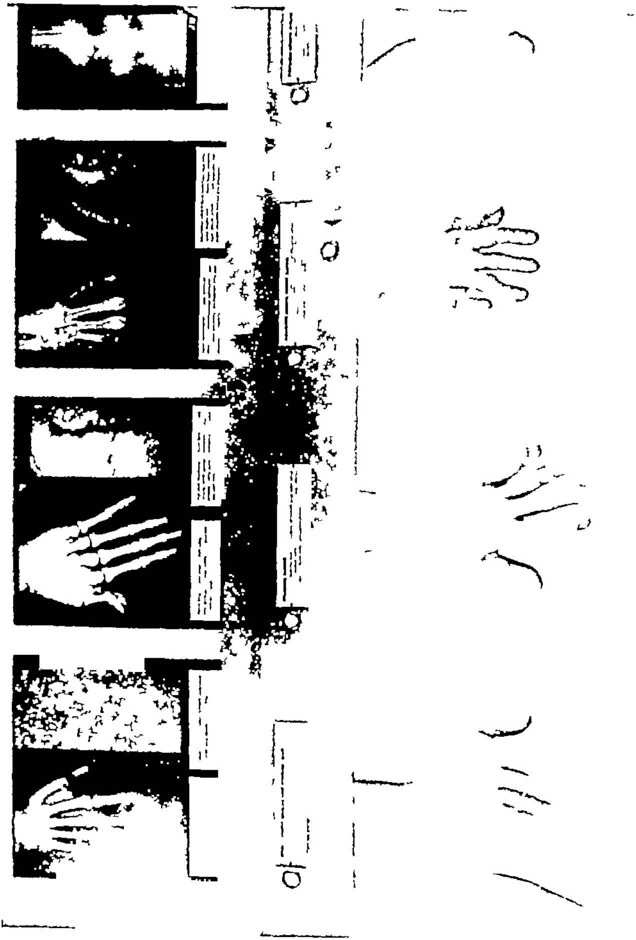
The exhibit illustrates the various heumatic diseases affecting the hand and how differential diagnosi can often be made from these members alone. Fourteen hand moulages are presented, including normal hand, four different stages of rheumatoid arthritis, two of osteoarthritis, and one of acute rheumatoid arthriti in hand previously ffected by osteoarthritis. In addition there are hand moulage presenting early and late scleroderma, an acute shoulder hand syndrome, chronic shoulder-hand syndrome with Dupuytren' contracture psoriatic arthritis, and one of gout. Accompanying each hand is an -ray and kodachrome photomicrograph enlargement showing the pathologic changes in each case Diagrammatic charts illustrating the osteo pathology of rheumatoid and osteoarthritis are lso pr sented.

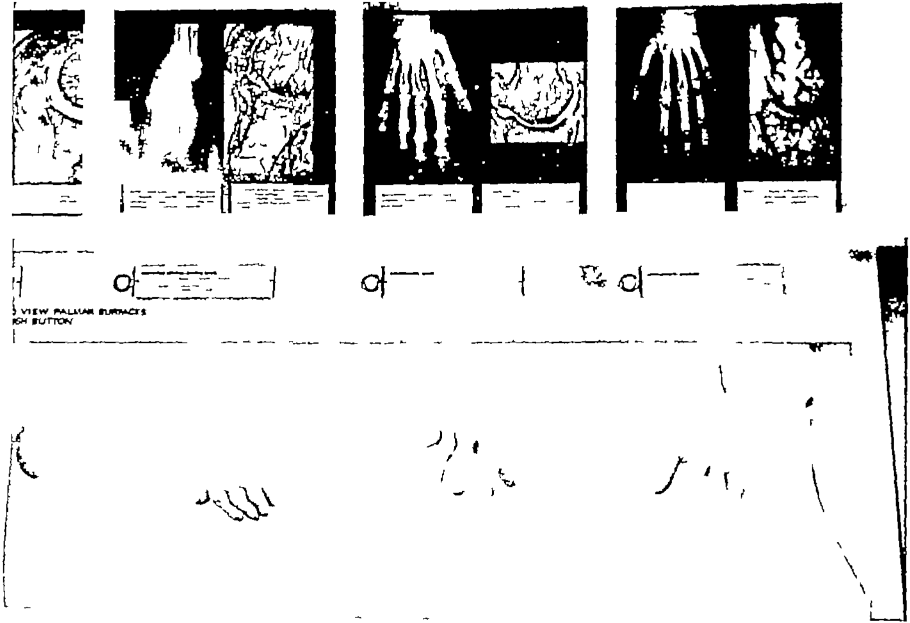


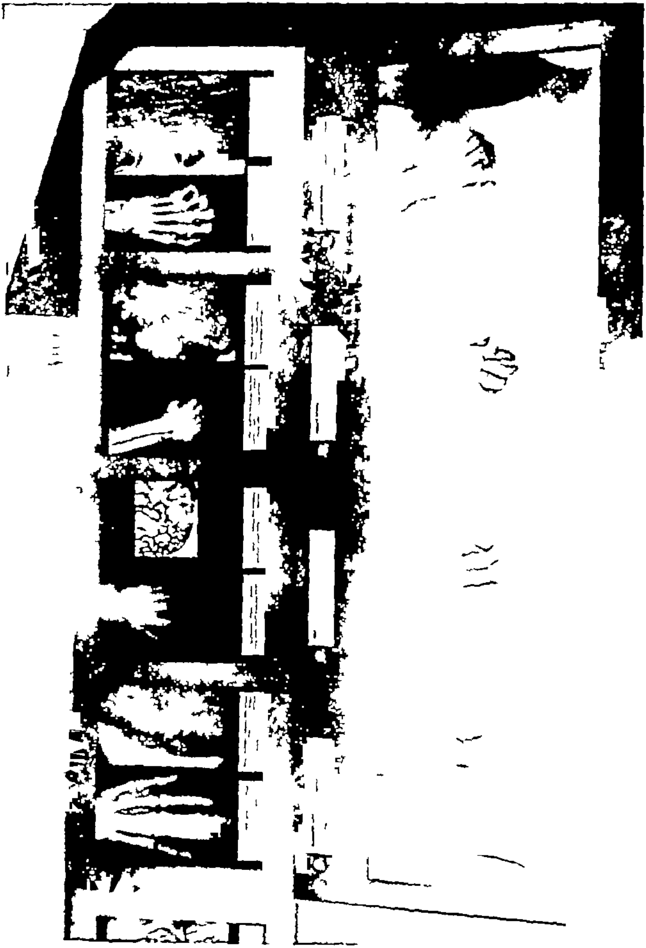


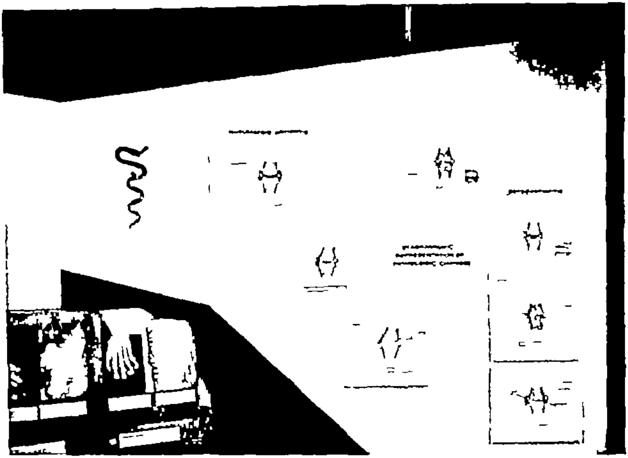
Observe with care
The hand you shake
A diagnosis
Oft you'll make






VIEW PALMAR SURFACES
BUTTON





An exh bit of he Rh umatology Cl n
Georgetown Un er ity Ho pital Georg to n Un C
V a In on c

Dar I C. Cro M D D or
Elbert T Phelps M D Coordinator Rheumat m A t ties
Jam A Kehoe M D Joseph A K H M D Antoinette Popovi M D A
M ton C Cobey M D Ala R Cro n D Orthopedic Consul nt
Rosilie Dumm R N Chief Nur

Conditions

Th exhibit presente under grant from
Rheum in Association of ... on Was ing D C

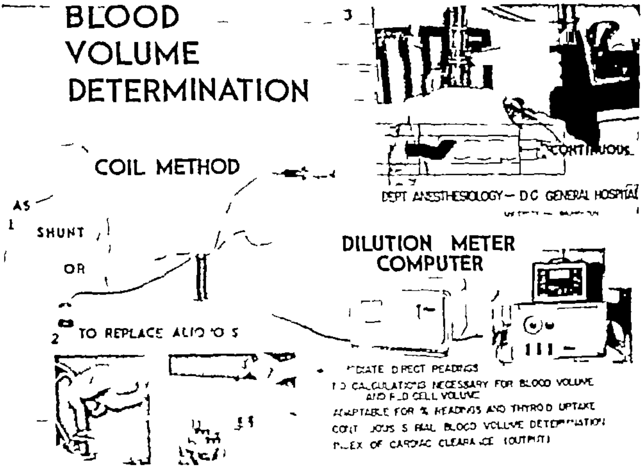
Photo ... reproduced ... by
... by ... and ...
... of The Arm ... and Rheumat ...
Leon Schlieff Cha

X ... prepared by Eugene Cowen D
Hand ... prepared by F ... Baltimore Md



A Simple Method for Blood Volume Determinations. S N Albert W O Swan and W A. Spencer District of Columbia General Hospital Washington D C.

A dilution meter computer giving direct blood volume readings is presented This computer is adaptable for continuous blood volume determinations. Its value is apparent for general hospital use The coil technique for measuring radioactive isotopes in solution dispenses the use of calibrated glassware pipettes and test tubes. It also minimizes contamination, technical errors and constant attendance by qualified technicians.



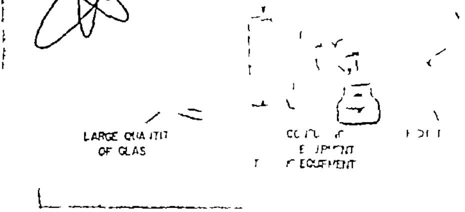
1 Serial blood volume determination by shunt system- withdrawing blood from venous cannula through plastic coil

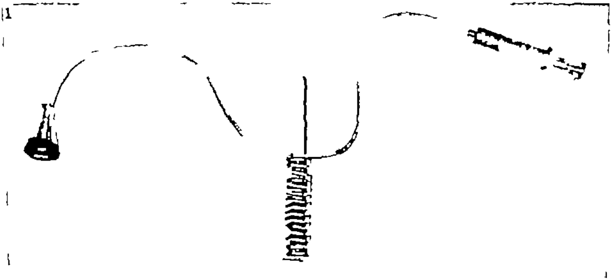
2 Routine Method whereby coil replaces pipettes and test tubes for accurately measuring samples Coil remains permanently fixed in well counter

3 Continuous blood volume by placing counter over precordium

STANDARD METHOD

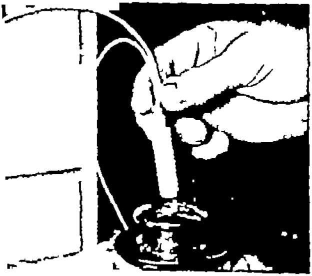
OF COUNTING RADIOACTIVITY IN LIQUID PHASE



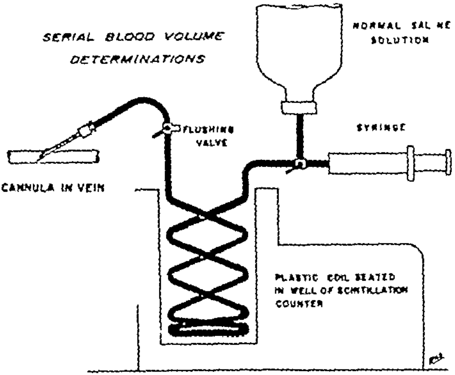


1 Plastic Coil System

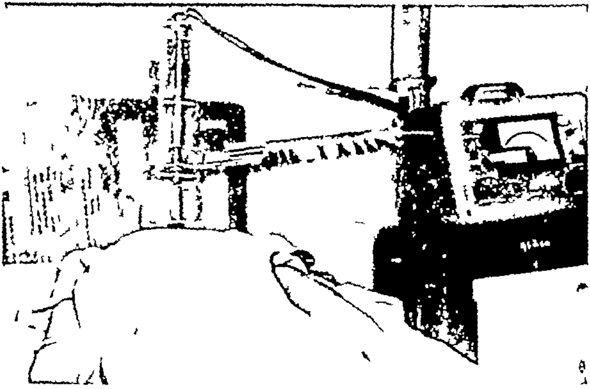
2 Placing coil in well counter- it remains permanently fixed



Plastic coil replaces all test tubes and pipettes in standard method



Schematic of Shunt System



Counter placed over precordium and standardized with count of first blood sample taken Continuous blood volume determination is made without further blood sampling

STANDARD METHOD

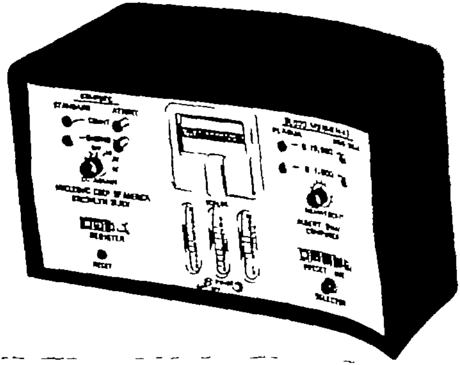
OF COMPUTATION



CALCULATING EQUIPMENT



TIME CO...



Computer gives direct readings of calculated results a sample count It is adaptable for direct reading percentage distribution continuous blood volume output

The Effects of Relaxin on Connective Tissue

Robert J Boucek, Nancy L Noble Gus G Casten Harry R Elden Kung-Ying T Kao and J Frederick Woessner Jr the Howard Hughes Medical Institute Miami Fla

The effects of the hormone relaxin upon connective tissue obtained by sponge-biopsy technique in the rat are presented. The data consist of biochemical observations as well as physical chemical characterizations of the solubilized collagen. The effects of relaxin upon scleroderma are included Relaxin affects favorably the trophic ulcers Raynaud's phenomenon and generalized skin tightness.

RELAXIN

IS PEPTIDE-LIKE MATERIAL SECRETED BY THE MAMMALIAN OVARY DURING PREGNANCY

APPEARS TO CHANGE THE GROUND SUBSTANCE OF CONNECTIVE TISSUE IN THE PUBIC SYMPHYSIS

APPEARS TO PRODUCE ITS EFFECTS FOLLOWING ESTROGEN PRIMING

HAS FOUND ITS CHIEF USE IN UTERINE AND CERVICAL RELAXATION IN DYSTOCIAS

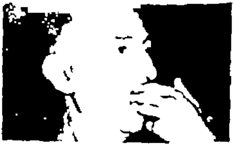
APPEARS TO BE NON TOXIC IN ANIMALS AND MAN AT RELATIVELY HIGH DOSES

Relaxin is prepared by the W[illegible]rner-Chilcott

Fig 1



Fig 2



CASE HISTORY

Case [illegible] W F [illegible] Age 56

Chronic progre[illegible]ive scleroderma of 8 y[illegible] duration.

Extensive involvement of [illegible] and pulmonary insufficiency.

Raynaud phenomenon, and [illegible]ophic ulc[illegible].

Previous therapy with Cortisone [illegible] sympathectomy of no benefit.

Figs 1 Scleroderma [illegible] mouth permitting [illegible] two finge[illegible]

Figs 2 Afte[illegible] [illegible] with [illegible]

Figs 3 Ch[illegible] [illegible] ophic [illegible]

Figs 4 Healed [illegible] afte[illegible] Relaxin R[illegible]



Fig 3



Fig 4

CLINICAL FEATURES OF 21 P TIENTS WITH SCLERODERMA

	15 FEMALES	MALES
Age range:	21 years to 50 years	21 years to 56 years
Duration of disease:	4 months to 20 years	2 years to 20 years
Period of Relaxin	6 months to 30 months	6 month to 30 months

Manifestations of dise se responding to Relaxin:

Skin tightness

Trophic ulcerations

Raynaud's phenomenon

No benefit observed in esophageal constriction, renal, pulmonary or renal involvement

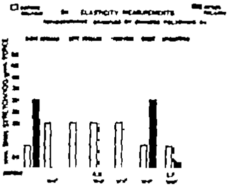


Fig 5



CASE HISTORY

Case # 1 B. van M., W ♀ Age 21.

Generalized seve scleroderma of 4 years duration with trophic ulc ration, Raynaud phenomenon, kin tightness, cardiac and pulmonary involvement

Fig 6



Figure 5 Severe ulc ration of both index fingers of 2 month duration.

Figure 6 Healing afte 18 days of Relaxin R_x.

Figure 7 Ulc r of right 5th finger of 3 months duration.

Figure 8 Healing after 18 days of Relaxin R_x.

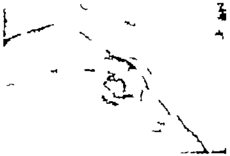


Fig 7



Fig 8



Fig 9

CASE HISTORY

Case # 17 W L.J., W ♂ Ag 32

Raynaud phenomenon, trophic lc tion mild kin tightne

Figure 9: Ulc of ight inde fing of 6 month duration.

Figu 10 H led aft 1 month l Relaxin R_x.



Fig 10

Fig 11

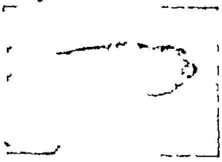


Fig 12



RAYNAUD'S PHENOMENON

J. O., W ♂ Age 38

Fou yea hi tory of digital ischemia with previous amputation of 3 digit of right hand and 2 digits of left hand

Sympathectomy and odilating drug of no benefit.

Figu 11: Painf l R ynaud episode with impending gang ne of left fifth fing

Amputation advised but refused.

Figur 12: Fing afte 20 days Relaxin R_x. Pain-f ee

CASE HISTORY

P. P., W ♀ Age 34.

Biopsy-proven BUERGER'S DISEASE of 15 yea duration.

Severe intermittent claudication. Bilateral sympathectomy at age 30.

Figure 13 Painful, progressive ischemic, purulent ulcer on dorsum of right foot of 3 months duration.

Figure 14 Ulcer after 18 days of Relaxin Rx. Pain-free

Figure 15: Ulcer afte 30 days of Relaxin Rx. Pain-free

Figure 16: Ulcer after 51 days of Relaxin Rx. Pain-free



Fig 13

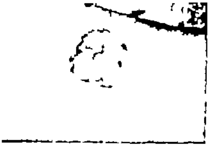
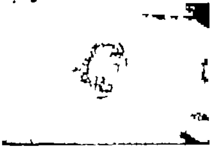


Fig 14

Fig 15



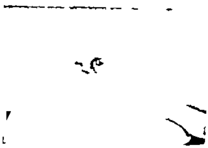


Fig 16

ARTERIOSCLEROSIS OBLITERANS

R.M.G., C ♀ Age 38

Ischemic ulcer of 4th left toe of 6 months duration requiring amputation 3½ y rs ag

Figure 17: Amputation It unhealed after 3½ year conventional therapy Chronic infected ulc r quite painful.

Figure 18: Afte 3 months Relaxin Rx. ulc completely healed and pain-free (covered by dry crust)

Fig 17



Fig 18



EFFECTS OF RELAXIN UPON CONNECTIVE TISSUE

(Rat)

Decreases in Collagen Formation

	Total Protein[1]	Total Collagen[1]
Control ♂	0 684	0 274
R_X ♂	0 678	0 238*

*Significantly different from control

1 gm /gm sponge implant

Alters Collagen Fibers

Control  R_X

Depolymerizes Ground Substance

Decreases the Rate of Cholesterol Synthesis in Connective Tissue in Vitro Synthesis of Cholesterol

	C T[1]		Liver[2]	
	♀	♂	♀	♂
Control	512	649	142,364	107,346
R_X	276*	417*	113,421	113,021

*Significantly different from control

1 cpm/gm sponge implant

2 cpm/gm. tissue wt

Increases the Number of Mast Cells and Alters the Morphology of the Cells

Control  R_X

Does Relaxin Affect Scleroderma?

Yes Daily parenteral administration of relaxin increases the elastic properties of the skin, diminishes Raynaud's phenomenon and causes trophic ulcers to heal

Does Relaxin Reverse the Progression of Scleroderma?

No, nor are the visceral manifestations of Scleroderma altered by therapy

How does Relaxin Work?

Probably by its action upon connective tissue and upon its vascular supply

Is Relaxin Safe?

Yes The only side effect of any note has been menorrhagia in three of the patients

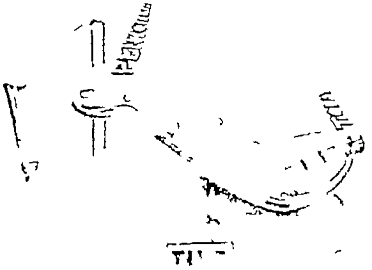
Must it be administered parenterally?

Yes Oral preparations have been ineffective

Honorable Mention

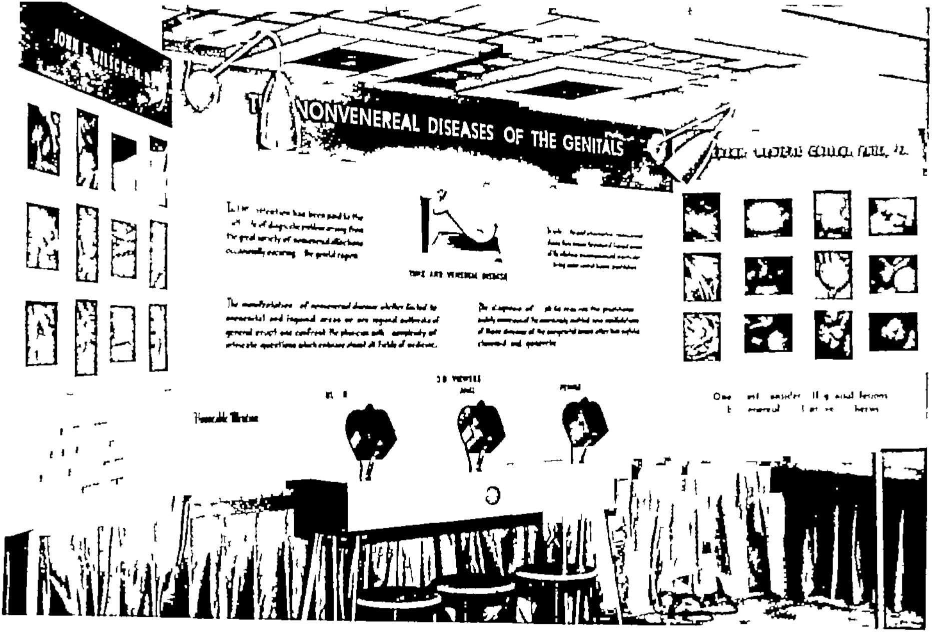
The Nonvenereal Diseases of the Genitals. The Differential Diagnosis of Genital Lesions. John Francis Wilson Jefferson Medical College Philadelphia.

This is a stereophotographic teaching exhibit showing the differential diagnosis of nonvenereal from venereal lesions. The exhibit includes the various genital areas (1) penile and scrotal lesions; (2) vulvar lesions; and (3) anal lesions.



o Wilson John F Cutaneous Diseases of the Vulva" The Medical Clinics of North America 39 1741 (Nov) 1955 W B Saunders Phila Pa

• Callomon Fritz T and Wilson John F The Nonvenereal Diseases of the Genitals Charles C Thomas Springfield Ill 1956

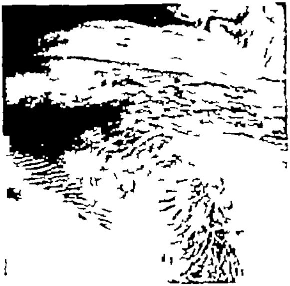

NONVENEREAL DISEASES OF THE GENITALS



Localized Neurodermatitis



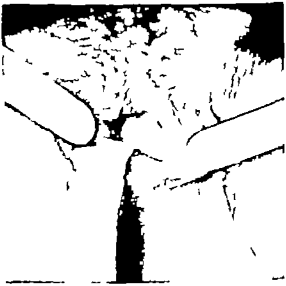
Diaper Rash



Psoriasis Seborrheic Type



Xray Dermatitis



Leucoplakia



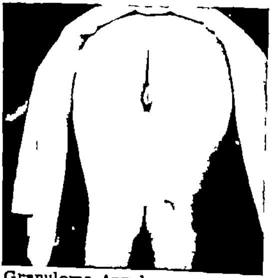
Intertrigo ○



Intertrigo



Localized Neurodermatitis



Granuloma Annulare



Epithelioma Squamous Cell *



Lichen Sclerosus



Verrucae



Herpes Progenitalis



Psoriasis *



Diaper Rash



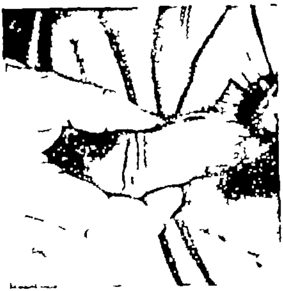
Seborrheic Dermatitis



Exfoliative Dermatitis



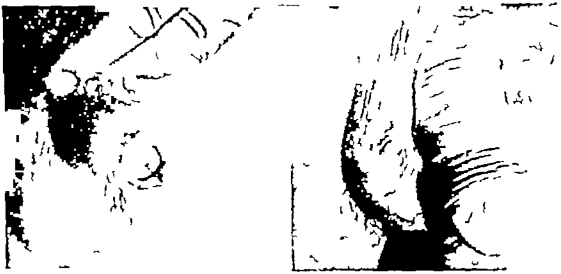
Localized Neurodermatitis



Lichen Planus



Miliaria



Balanitis Xerotica Obliterans



Leucoplakia



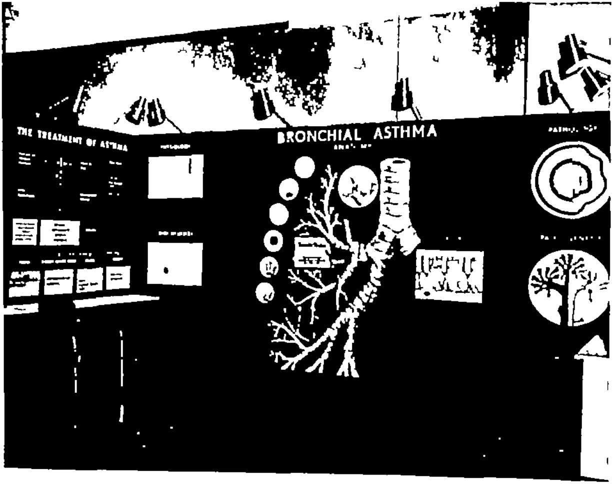
Hemangioma *

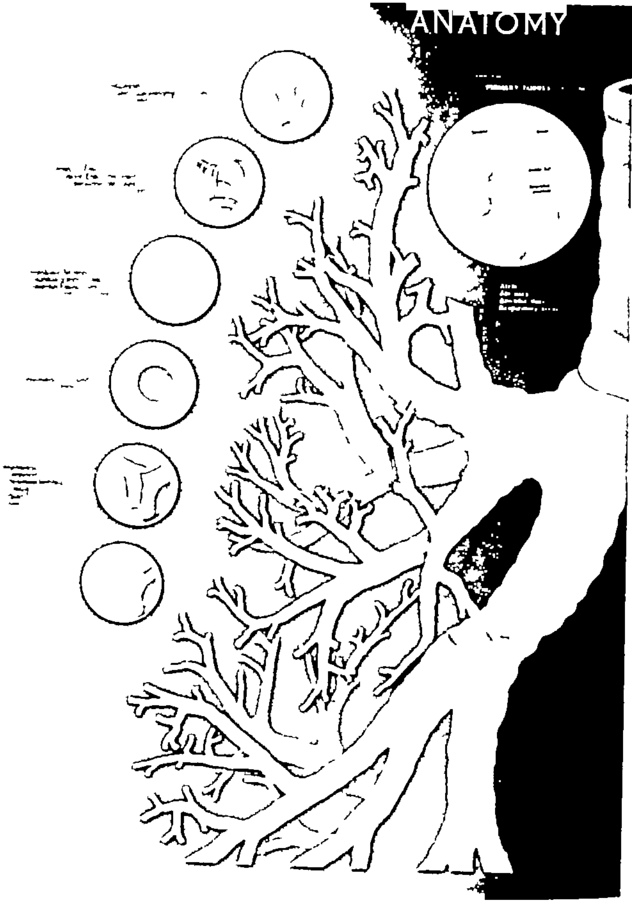
Honorable Mention

DISEASES OF THE CHEST

Bronchial Asthma John W Irwin Irving H Itkin Sandylee Weille and Nancy Little Massachusetts General Hospital Boston.

The bronchial tree is the area of response in asthma and the anatomy physiology and biochemistry of this area are described in detail. During the asthmatic seizure certain pathological changes do occur and these are considered Therapy is presented pointing out the action of each method and therapeutic agent on the bronchial tree The following drugs, which are used for symptomatic relief are discussed expectorants sedatives aminophylline ephedrine epinephrine certain N substituted arterenols, and the adrenocortical steroids. The exhibit presents a clear understanding of the pathology of asthma as well as a rational approach to therapy




ANATOMY

ANATOMY



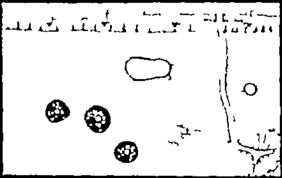
CELLS



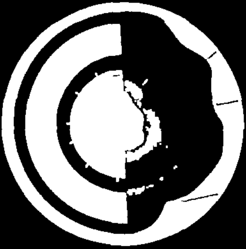
PHYSIOLOGY



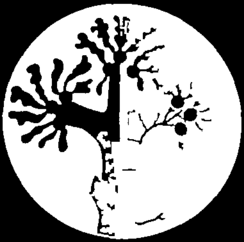
BIOCHEMISTRY

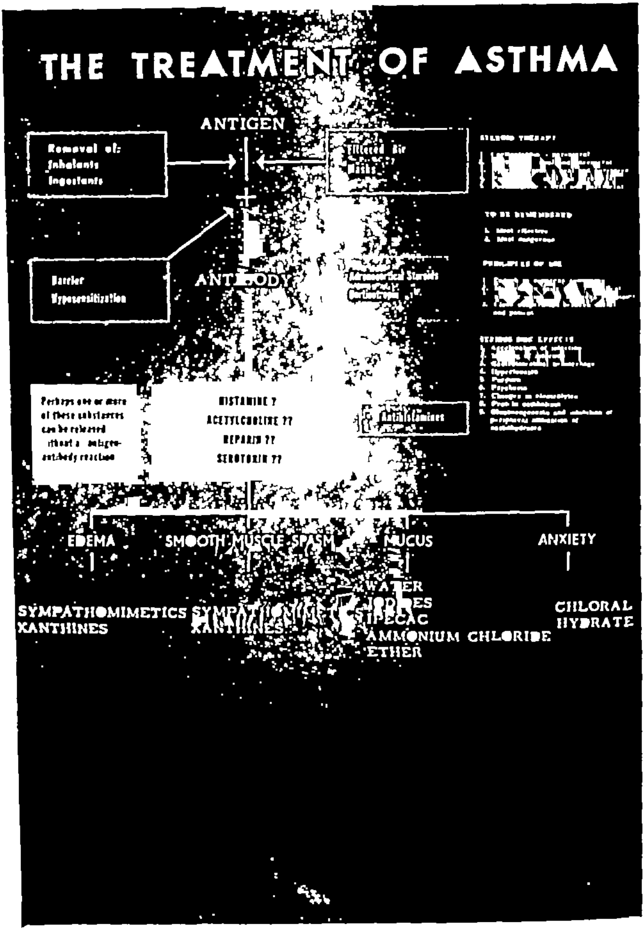


PATHOLOGY

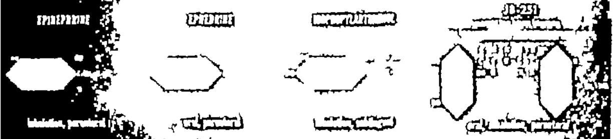


PATHOGENESIS




THE TREATMENT OF ASTHMA
ANTIGEN
Removal of:
Inhalants
Ingestants
Filtered Air
Masks
Barrier
Hyposensitization
ANTIBODY
Adrenocortical Steroids
Corticotropin
STEROID THERAPY
TO BE REMEMBERED
Perhaps one or more
of these substances
can be released
without a antigen-
antibody reaction
HISTAMINE ?
ACETYLCHOLINE ??
HEPARIN ??
SEROTONIN ??
Antihistamines
EDEMA
SMOOTH MUSCLE SPASM
MUCUS
ANXIETY
SYMPATHOMIMETICS
XANTHINES
SYMPATHOMIMETICS
XANTHINES
WATER
IODIDES
IPECAC
AMMONIUM CHLORIDE
ETHER
CHLORAL
HYDRATE

SYMPATHOMIMETICS



PATIENTS' ESTIMATE OF EFFECTIVENESS

DOUBLE-BLIND STUDY

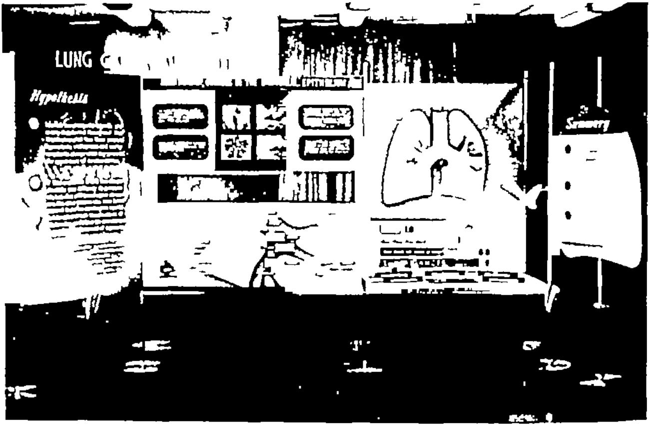


Honorable Mention

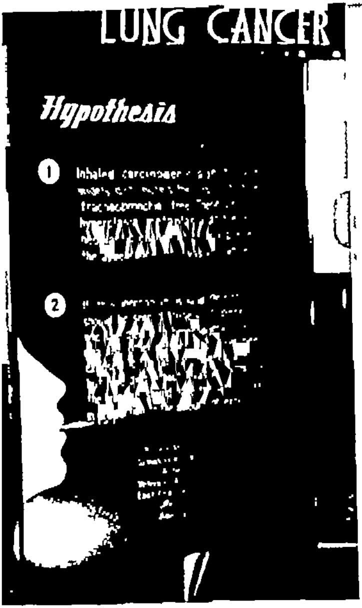
DISEASES OF THE CHEST

Lung Cancer and Smoking: Relationship and Changes in the Bronchial Epithelium. Oscar Auerbach, J Brewster Gere Harold J Smolin Jerome B Forman Gerald E. Muehsam Joseph M Pawlowski and Arthur Purdy Stout Veterans Administration Hospital East Orange N J

The exhibit gives the hypothesis and methods used in conducting of survey methods used in doing research (actual work); together with color transparencies of photomicrographs (normal and changes in the epithelium) There is also shown an over sized bronchial tree and 3 dimensional moulage Several 3 D graphs in plastic are presented with the number of cases and slides studied Summary and conclusions reached by this research project are included

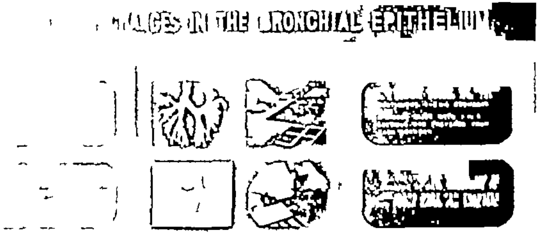


This type exhibit is a free-standing one, utilizing light weight aluminum tubing (Struc-tube) which makes for easy assembly The panels have been so designed as to give a visual interest through spatial change and color while tieing together the panels concerned with methods and material with the hypothesis and summary panels



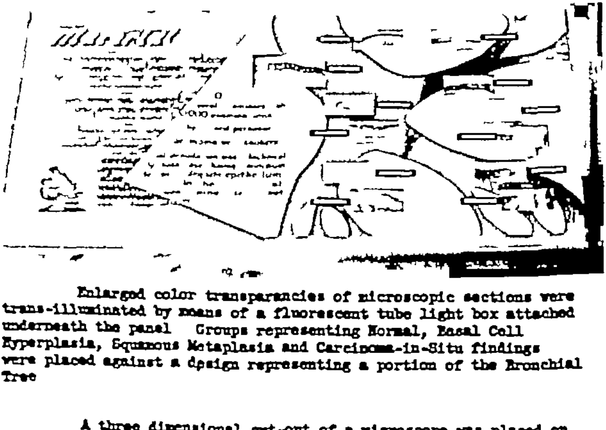
This panel, which introduces the viewer to the subject, incorporates the hypothesis with the presenting authors of the exhibit

A graphic figure is employed here to add a note of realism relating to the subject matter and at the same time ties the panel together design-wise while leading the viewer into the body of the exhibit



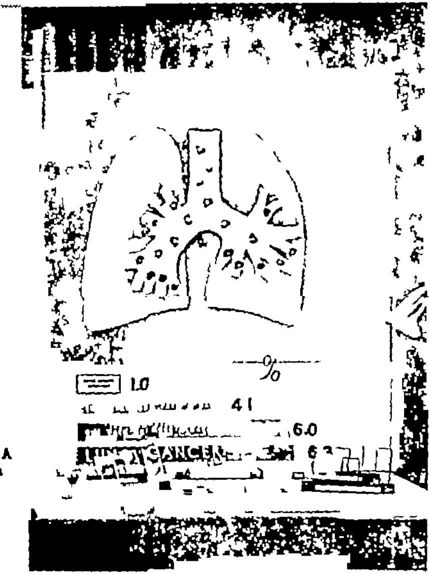
The title on this panel becomes visually a part of the main title and leads directly into the methods employed for securing data

The four main steps taken are presented by trans-illuminated photo transparancies with accompanying text This panel again is designed to lead the eye down to the microscopics panel below



Enlarged color transparancies of microscopic sections were trans-illuminated by means of a fluorescent tube light box attached underneath the panel Groups representing Normal, Basal Cell Hyperplasia, Squamous Metaplasia and Carcinoma-in-Situ findings were placed against a design representing a portion of the Bronchial Tree

A three dimensional cut-out of a microscope was placed on the panel to immediately identify it as pertaining to tissue findings



Statistics are presented on this panel by employing clear plastic bars cut to proportion for each per cent A color code which can be seen through each bar indicates the degree of pathology in each group

As a background for this a large three-dimensional model of the tracheobronchial tree was mounted above containing scattered flicker lights in red to simulate sites of pathology

In all cases, three dimensional letters were utilized.

An abstract shape of the lung was used for the Summary Panel, shaping it in such a way as to lead back into the body of the exhibit The point being to reemphasize the connection with the subject matter presented and also to play up the panel with the model on it

The overall color scheme was limited to 3 colors, blue, yellow and grey with each panel designed to give counter-point to the next

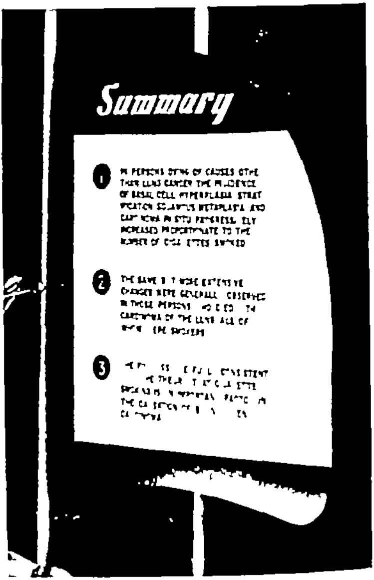


Exhibit designed and fabricated by the

Medical Illustration Service

Veterans Administration Hospital
East Orange New Jersey

Certificate of Merit

Bronchial Drainage: Physiologic and Mechanical Aids to Bronchial Evacuation. *Edwin R. Levine and Abel Froman Chicago Medical School and Edgewater Hospital, Chicago.*

The exhibit discusses the physiologic reasons for obstruction of the bronchi by secretion. It shows the application of inhalational technics The use of positive and negative pressure apparatus and the application of aerosols are demonstrated

BRONCHIAL DRAINAGE

PHYSIOLOGIC AND MECHANICAL AIDS TO BRONCHIAL EVACUATION

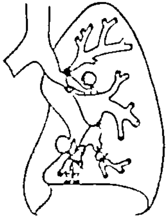
Edwin R. Levine and Abel Froman

Chicago Medical School and Edgewater Hospital Chicago

The problem of establishing adequate therapy in bronchial disease is made more complex by reason of multiple pathological and physiological factors existing in each case Therapy must be directed at the correction of the functional impairment rather than producing symptomatic relief Programs of treatment vary combining several methods of approach in the beginning and often eliminating them one at a time as the patient improves. *Liquefaction of bronchial secretion by adequate aerosol* therapy appears to be an important part of treatment when retention of bronchial secretions exist

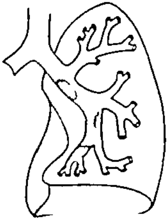
THE PROBLEM

BRONCHIAL DRAINAGE is as essential to health and as necessary to life as the conduction of air in and out of the lungs. In bronchial disease, certain pathological and physiological changes occur which interfere with adequate drainage and thus with respiration. Treatment should be directed at correction of these changes.



BRONCHOSPASM. The bronchi normally lengthen and widen during inspiration and shorten and become narrow during expiration. When this normal expiratory narrowing becomes exaggerated, spasm may result. This may be general along the length of bronchus producing uniform narrowing, localized as though string were tied around the wall or irregularly beaded in form. All of these prevent the elimination of secretion and interfere with the passage of air

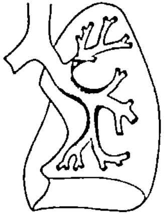
VISCOSITY The thicker the secretion is, the more obstruction it causes. As the viscosity increases the mucoid material becomes more sticky and adherent as well. It adheres to bronchial walls causing obstruction and irritation. This aggravates cough and causes bronchospasm, interfering more with proper bronchial drainage. It is important to remember that it is the adherence or sticking to the bronchial wall that holds the secretion in place—more than its actual viscosity



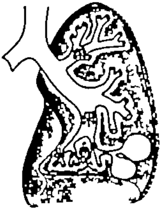


MUCUS GLANDS—In long standing bronchial irritation there are several pathological changes. Among these is tremendous hypertrophy of mucus glands. The volume of mucus produced is therefore very much greater than normal. This increased volume means just so much more secretion to be drained. If, as is generally true, the viscosity is greater and bronchospasm exists, an increase in mucus results in actual obstruction

THE PROBLEM



OBSTRUCTION—Anything interfering with the patency of the bronchial lumen causes obstruction. Solid structures like tumors, granulomas or foreign bodies may act in this fashion. Less solid material such as mucoid secretion may obstruct also. When bronchospasm or edema of the mucosa is present, secretion produces obstruction more easily. The smaller the bronchus, the easier it is to obstruct.



LACK OF EXPULSIVE FORCE—Velocity of the expiratory current is one of the major factors in the process of moving secretion up the bronchi. This is true during regular expiration as well as in cough. It is characteristic of all bronchospastic diseases that the expiratory flow is slower and of longer duration. Asthma, emphysema, pulmonary fibrosis, bronchiectasis and chronic bronchitis show this. There is thus too little expulsive force to eliminate secretion.



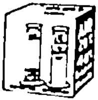
POSTURAL RETENTION—In the upright position, secretion tends to remain at the bases. Since there is no cough reflex in the small bronchi, it must be brought up to the larger ones by the muscular action of the bronchi and the expiratory gusts. With decrease in expulsive velocity and with bronchospasm, the secretion collects and thickens, adding to bronchospasm and interference to ventilation.

WHAT IS NEEDED TO SECURE ADEQUATE BRONCHIAL DRAINAGE

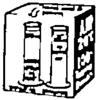
LIQUEFACTION OF BRONCHIAL SECRETION

A liquid free flowing bronchial secretion is necessary to assure proper drainage and evacuation of the bronchial tree.

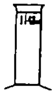
WATER INTAKE. It [illegible] water that liquefies bronchial secretion so sufficient water must be available. All inspired air must be completely saturated with water vapor. This [illegible] done by the mucosa of the respiratory passages. Water intake must be adequate for both as well as other body needs.



During each 24 hour period [illegible] of water added to inspired air by the bronchi. Expired air always saturated.

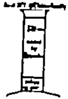


Even if inspired air saturated [illegible] 20 C [illegible] warmed to 37 C hold [illegible] moisture. This must also come from the bronchi.

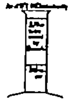


This [illegible] required every day to saturate respiratory air. Inadequate [illegible] secretion.

HUMIDITY OF INSPIRED AIR. Saturating the inspired air may cause no problem to healthy bronchi. Diseased and irritated bronchi require humidification of inspired air to prevent drying and further irritation.



Th[illegible] is the volume of water that the respiratory mucosa must add in 24 hours to inspired air at 20°C, 40% relative humidity. This is extremely drying.



Even air 100% saturated at 20 C becomes dryer when heated to 37 C in the bronchial tree. The mucosa must still add 37% of water [illegible] day.

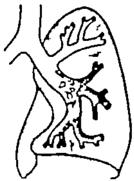
ALL INSPIRED AIR HAS SOME DRYING EFFECT ON THE BRONCHI

AEROSOLS—Only an Aerosol can add moisture to the bronchial mucosa or add liquid to bronchial secretion.

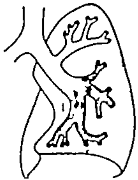
TYPES OF AEROSOLS

Adequate but irritating [illegible] SALINE. Non-irritating—satisfactory—slow.

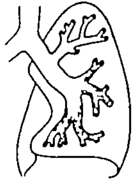
[illegible] No irritation. Water penetrates rapidly into bronchial secretion. Quicker liquefaction. DETERGENT PLUS KI [illegible] Tergemist. The action of detergent aerosol plus the mucolytic action of KI. No irritation.



NORMAL SALINE. It is relatively difficult for normal saline in aerosol form to penetrate into mucoid secretion. This difficulty increases as the mucus becomes more [illegible]. Adequate liquefaction of bronchial secretion may be secured with an aerosol of normal saline but might require hours of constant administration.



DETERGENTS IN WATER. The detergent or wetting agent lowers the surface tension of the mucoid secretion and permits the more rapid entrance of water into it. Bronchial secretion is liquefied in less time. 30 minutes of detergent aerosol treatment [illegible] equivalent in effect to several hours of normal saline.



DETERGENT PLUS KI Tergemist. The rapid penetration of water into the mucoid secretion by action of the detergent plus the mucolytic effect of KI. Secretion does not adhere or stick to the bronchial wall and may be expectorated while it is still thick and tenacious. Drainage is easier and more complete.

WHAT IS NEEDED TO SECURE ADEQUATE BRONCHIAL DRAINAGE

MAINTENANCE OF BRONCHIAL LUMEN



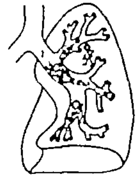
OBSTRUCTION—Any mechanism which obstructs the bronchial lumen prevents adequate drainage. [illegible]



BRONCHOSPASM—[illegible]



PRESSURE BREATHING [illegible]

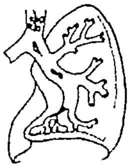


EVACUATION OF THE BRONCHI

COUGH—The mechanism of cough resembles the firing of gun.







RELIEF OF BRONCHOSPASM







[illegible]

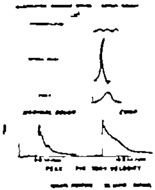
WHAT IS NEEDED TO SECURE A EQUATE BRONCHIAL DRAINAGE

EVACUATION OF THE BRONCHI

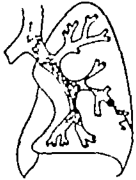
EXSUFFLATION WITH NEGATIVE PRESSURE



[illegible]

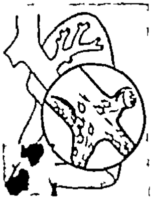


[illegible]



[illegible]

COMBINED THERAPY – Several procedures may be combined to aid evacuation of the bronchi. These should be determined by the problems present in each individual case.



[illegible]



[illegible]

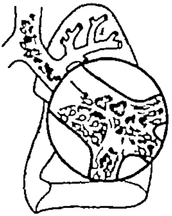


[illegible]

RESULTS OF TREATMENT

AEROSOL THERAPY - Detergent plus potassium iodide (Tergemist)







CASE REPORT. F. L., female, age 26, had recurrent bronchitis which now showed severe spasmodic cough with little expectoration of thick greenish yellow sputum. Dyspnea was marked on exertion and after cough. Temp. 101.5° Blood count indicative of infection. Examination showed rhonchi and wheezes all over chest. Fluoroscopy and X-ray showed some increased bronchial markings but no abnormal lung shadows. She had been on penicillin and broncho-dilating cough mixture for 5 days without noticeable improvement.

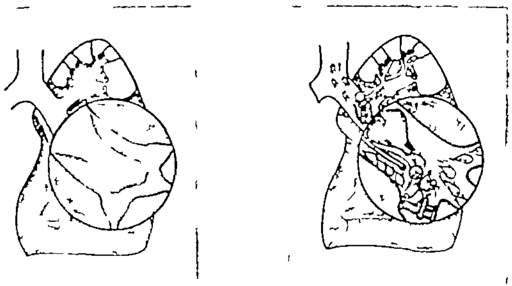
The following program was instituted. Broad spectrum antibiotics, continuation of cough mixture, increase of fluid intake and Aerosol Tergemist ½ hour q.i.d. The next morning she began to expectorate very viscous—almost solid—chunks of mucopurulent material. The cough was still severe and spasmodic, temperature had decreased little. Many rhonchi showed all over chest. Dyspnea unchanged.

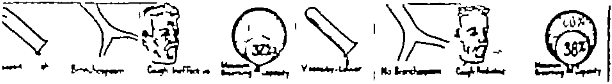
All during that day she continued to expectorate thick mucus. This was especially marked after each half hour aerosol treatment. The second morning she expectorated large amount of sticky liquid sputum. Dyspnea was very much less and examination of the chest was clear except on cough when rhonchi were heard.

Throughout the day coughing became progressively easier and less spasmodic. Expectoration continued but the sputum was liquid mucopurulent material and the patient could walk around without dyspnea. Wheeze and rhonchi had disappeared entirely. Therapy was continued and cough and expectoration disappeared completely in 7 days.

RESULTS OF TREATMENT

AEROSOL THERAPY (Tergemist) – Intermittent positive pressure breathing – Exsufflation





CASE REPORT J. K., male, age 63, had an advanced silicosis with bronchiectasis, emphysema, pulmonary fibrosis and cor pulmonale. He had been completely disabled for 7 years, was dyspneic at rest and walked only with the greatest difficulty, stopping frequently to catch his breath. His cough occurred in wracking spasms and he expectorated thick grayish green sputum. Examination revealed very diminished breath sounds with rhonchi and rumbles all over chest. Fluoroscopy and X ray showed large solid masses of silicotic fibrosis occupying the middle ⅓ of both lung fields and emphysematous blebs above and below. The diaphragm was depressed and immobile and the entire chest cage raised and lowered on respiration.

He was given bronchodilating medication and broad spectrum antibiotics. IPPB was started using isoproterenol 1:200, 5 drops, and 3 cc. Tergemist, ½ hour q. i. d. Immediately following these treatments, exsufflation was used. Expectoration was very much increased and cough seemed easier.

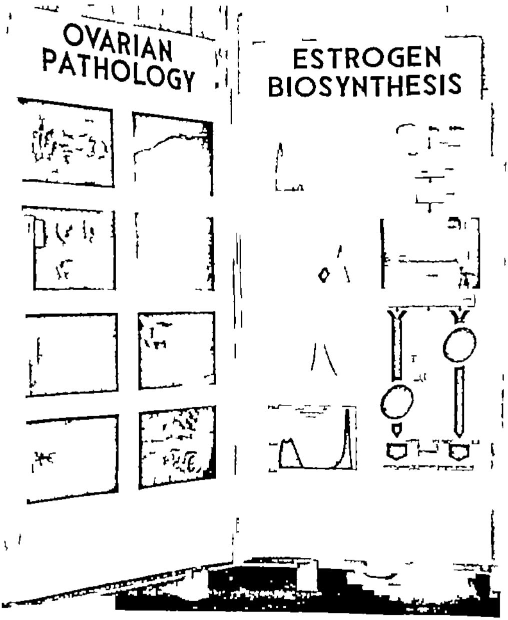
On the second day of treatment, he began to expectorate black material which he said resembled his expectoration when he worked in the foundry. Examination showed this to be silicotic and anthracotic. At this time there was noticeable improvement in his breathing and much longer periods between cough. The treatment was continued and the improvement noted was relief of dyspnea, ability to walk with increasing ease, and disappearance of cough spasms although productive cough continued with expectoration of liquid sputum. Pulmonary function tests showed improvement in ventilation and oxygenation of blood. ECG remained unchanged. As the drainage of the bronchi improved, this patient was able to walk about on level ground without dyspnea.

Treatment designed to improve Bronchial Drainage must be directed toward the pathological and [illegible] physiological handicap. The degree and extent of the therapy will depend upon these two factors and the rate of improvement. It is often necessary to start with one type of treatment and later combine [illegible] others as determined by the clinical picture. On the other hand, as the patient improves, therapy may be simplified. Liquefaction of bronchial secretion by adequate aerosol therapy is an important part of treatment in all cases where there is retention of bronchial secretion.

Certificate of Merit

Estrogen Biosynthesis by Postmenopausal Human Ovaries. H. M. Lemon, H. H. Wotiz, S. C. Sommers L. Parsons, and J W Davis, Boston University School of Medicine and Massachusetts Memorial Hospitals, Boston

The exhibit illustrates the principles of the method, whereby human ovaries are incubated with 1-C^{14} radioacetate and chorionic gonadotropin, and radioactive substances later isolated from the medium by appropriate xtraction followed by countercurrent partition in suitable solvent systems. These substances behave identically with stradiol 17B, estrone, and estriol in the Craig counter-current machine and maintain constant radioactivity when re-crystallized or chemical derivative are prepared therefrom. There are included representative gross, microscopic, and biochemical observation of ovaries with cortical stromal hyperplasia, polycystic disease (Stein-Leventhal syndrome), or ovarian adenocarcinoma chiefly from patients whose menopause was either spontaneous or induced by 2,000 The relationship of ovarian cortical stromal hyperplasia to strogen-stimulated cancer of breast and endometrium is summarized. The principal clinical applications derived from knowledge of postmenopausal ovarian strogenic activity are presented (1) In benign disease conservation of ovarian tissue is important in ll age groups; (2) in malignant disease, ovariectomy I the only reliable procedur eliminating ovarian strogenic activity and should be performed p to the age of 65-70 years; (3) ovariectomy up to age 65-70 per mits ffective use of cortisone and prednisone for medical inhibition of adrenocortical strogenic activity in palliation of advanced cancer of breast.



SCIENTIFIC EXHIBIT

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Estrogen Biosynthesis by Post-Menopausal Human Ovaries

Ovarian dysfunction has been suspected as a cause of numerous disorders for many years ever since recognition was accorded to the important role the ovary plays in fema le reproduction and metabolism. In mammals the ovary contributes androgenic estrogenic and at least one progestational steroid to the blood-borne pool of sex hormones, which is further supplemented from the adrenal cortex. Urinary excretion studies have shown cyclic alterations in estrogenic activity during normal menstruation, but the level of excretion of estrogens is so low that their characterization and quantitative determination is extremely d fficult in the amenorrheic and non-pregnant individual (1) This same analytical problem confronts the investigator who is concerned with ovarian secretory activity in various patholog c states which are accompanied by clinical evidence of abnormal sex hormone production, infer t lity or neoplastic disease in female accessory sex glands such as breast and endometrium.

Initiation of work presented in this exhibit was stimulated by several str king clinico-pathological correlations which have evolved from a careful pathologic study of ovaries by several investigators during the past twenty years

1 In the young adult female Stein and Leventhal reported in 1935, a syndrome of menstrual disturbance and infertility with varying hirsutism associated with bilateral polycystic enlargement of the ovaries (2) Hyperthecomatosis subsequently was accepted as a variant of this disorder Wedge resection extending to the ovarian hilus permits [illegible] return of normal menstrual function in about two-third of cases (3) Subsequent studies have indicated an increased incidence of mammary and endometrial carcinoma in this syndrome (4)

2 G V S Smith in 1941 first noted hyperplasia of stromal and theca cells in 87% of ovaries of post-menopausal endometrial carcinoma (5 6 Hertig, Woll, Smith, and their associates subsequently broadened this concept into that of [illegible] multi-potential hyperplasia of ovarian stroma, which was encountered with nearly twice the frequency in all age decades in patients with endometrial cancer compared to controls (7) Numerous other investigators have confirmed this relationship between endometrial carcinomas and ovarian stromal hyperplasia, which primarily affects the cortex

3 Sommers and Teloh, in 1952 first reported [illegible] similarly noteworthy relationship between mammary carcinoma and cortical ovarian stromal hyperplasia in 83 [illegible] of patients (8, 9) They further investigated the relationship between this lesion and the effects of oophorectomy and reported an increase in the mean survival of patients with stromal hyperplasia, compared to those with atrophic ovaries (10

[4] Increasing clinical evidence has accumulated to indicate [illegible] marked association between endometrial carcinoma and thecal and granulosa cell tumors of the ovary which has been attributed to estrogen hypersecretion by these functioning tumors (11 12)

5 The diversity of ovarian pathology which has been described in association with amenorrhea and the menopause has not permitted valid conclusions concerning the relationship between the microscopic picture and absence of menstrual activity Clinically pathologically and pharmacologically either ovarian hypo- or hyper- estrinism may lead to interruption of menses. The nature of associated disorders of the breast endometrium or other organs appears to be related to the degree of persistent ovarian secretory activity when amenorrheic states develop

As yet the se hormonal imbalance accompanying hyperthecomatosis cortical stromal hyper plasia and simple atrophy of the ovary has not been defined There may often be associated clinical or pathologic evidence of inc eased adrenocortical secretory activity (13) Quantitative cytologic studies of the pituitary by Burt (Russfield) and Castleman and Sommers have revealed increased percentages of basophil and hypertrophic amphophil cells compared to controls in stromal hyperplasia suggesting that the ovarian disturbance is secondary to abnormal pitu tary gonadotropic secretory activity (14 15)

The induction of amenorrhea has been ut l zed in the treatment of advanced breast cancer for many years and oophorectomy is routine therapy for endometrial carcinoma The relative effectiveness

of radiation induced vs. surgical "castration has been debated Smith and Smith in 1953 were able to show a significant increase in life expectancy following early oophorectomy in advanced breast cancer chiefly in menopausal and post-menopausal women (16) Even so many patients were not palliated, perhaps because of compensatory augmentation of adrenocortical sex hormone secretion after oophorectomy With the advent of cortisone and the demonstration of its suppressive activity upon adrenocortical sex hormone production in adrenal hyperplasia by Wilkins in 1950 (17) and by Smith and Emerson in breast cance in 1954 (18) the potential value of total oophorectomy for cancer therapy increased greatly Cortisone therapy rather than suppressing tends to augment ovarian secretory function as shown clinically by Wilkins, whose amenorrheic patients commenced menstrual activity *This is perhaps explained by the marked increase in pituitary gonadotropic (follicle stimulating) hormone* secretion which occurs in most patients receiving corticoids (19 20) Since cortisone rarely objectively palliates advanced mammary or endometrial cancer in pre-menopausal or post-menopausal women under 65 unless oophorectomy precedes therapy (21) we have considered that demonstration of post-menopausal ovarian secretory activity would elucidate one cause for failure of hormonal therapy Secondly post-menopausal androgen or estrogen secretion by the ovary would appea to be of significance in delaying aging manifestations in the non-cancer patient through the well-known and major anabolic actions of sex hormones upon bone muscle and other non-sexual target tissues, which rapidly metabolize these steroids (22 23)

Therefore in orde to delineate ovarian secretory activity in pre- and post-menopausal states, we chose to measure the steroids secreted in vitro by freshly resected surgical specimens, under gonadotropic stimulus, using radioactive labeled two-carbon (acetate) fragments as substrate. Acetate molecules have long been recognized as the basic building blocks of sugars fat cholesterol and steroid molecules. Carbon 14 labeled acetate was added to the incubation medium, and the radioactivity eventually was noted as a specific activity of the isolated synthesized steroids. The following methodology has been utilized.

Experimental

The specimen of ovary was sliced in a Stadie-Riggs microtome and put into a flask containing 25 ml. of Krebs-Ringer phosphate buffer 10 000 units of penicillin G, 5 000 units of Antuitrin S, and approximately 60 uc of 1-C^{14} Acetate The mixture was then incubated at 37.5 for approximately 16 hours.

Following incubation the material was extracted by homogenization in a Waring blendor with 15 volumes of chloroform. After filtration the chloroform layer was dried over sodium sulfate filtered, and evaporated to dryness in Vacuo. The residue was diluted with approximately 5 mg. each of the three estrogenic carriers (non-radioactive estrone estradiol and estriol) and was dissolved in a mixture of 50 ml of hexane and 50 ml of 70% methanol The material was then partitioned by an 8 transfer countercurrent process between these two solvents. The contents of funnels 6 8 were combined, evaporated to dryness, and dissolved in 50 ml. of toluene and 50 ml of 1N potassium hydroxide. This was followed by another 8 transfer countercurrent partition between the latter two solvent systems. The phenolic fraction (funnels 6 8) was brought to pH 6 and extracted three times with methylene chloride and combined with the toluene layer followed by vacuum evaporation. The dried residue was then partitioned in a Craig countercurrent distribution apparatus with 29 transfers in the solvent system 30% methanol 50% chloroformic carbon tetrachloride. The contents of the tubes were transferred to marked test tubes, evaporated on the steam bath with nitrogen and the residue redissolved in 10 ml. of methanol One tenth of each tube contents was planchetted and counted at infinite dilution in an SC 50A Tracerlab flow counter The contents of the tubes containing radioactive material corresponding to a single peak or a small group of peaks were combined and repartitioned in the same solvent system and counted as before THESE RESULTS ARE ILLUSTRATED IN THE GRAPHS OF THE EXHIBIT The extracts in tubes corresponding to the theoretical peaks for Estrone (E) Estradiol (E") and Estriol (E") were combined for each individual steroid and taken to dryness on the steam bath. The residual material was then crystalli ed from aqueous methanol and an aliquot was counted in the flow counter Following recrystallization from methanol to constant specific activity a derivative was prepared and crystallized to specific activity

Control experiments with inactive tissues have not carried any radioactive impurity beyond the first 29 transfer countercurrent partition. In other experiments utilizing these techniques, the association of radioactivity with these steroids was proven (24)

Based on the dist ibution curves obtained from several such experiments it appears that

1 Ova es w thout follicles synthes ze estrogens.
2 Ova ies I radiated with 2000 r synthesize estradiol
3 Ovaries from post menopausal women synthesize estrogens.
4 Polycyst c (Ste n-Leventhal) ova ies synthesize estrogens.

Cl ic l Application of this Exhibit

Although these esults cannot definitely be assumed to indicate steriod biosynthesis **in vivo** they do conf m Doo Sm th and Emerson s cl nical f nd ngs of estrogen excretion after menopause (18 25) A few of the possible cl n cal applications may be cited

A Conservation of the aging ovary I non-malignant disorders

We believe that the practice of removal of the ova ies at the time of hysterectomy for ben gn d sorders in women beyond the age of forty is in error It is our contention that healthy ova rian t ssue should be p eserved at all ages in this group.

The common practice of removing the ovaries at the time of hysterectomy is based on the following p emises

1 Possible eterioration of ovarian function after hysterectomy
2 The ovary may undergo cystic degeneration, resul ing in follicular cyst that require further surgery
3 The retained ovary may subsequently become malignant in about two percent of pa ients.
4 Unpleasant menstrual symptoms such as pre menstrual tension, mastodynia, depression, irritability and abdominal distention are eliminated by oophorectomy
5 The ymptoms of castration menopause can be elieved by ingested or parenteral hormones.

We feel strongly that conservation, not destruction, of ovarian tissue should be our aim and offe the following easons n the rebuttal to the above premises

1 So many ovarian carcinomas are developmental in origin that if they show no gross sign of tumor at the time of hysterectomy they are unl kely to do so in subsequent years Ovaries to be left in situ at the time of hysterectomy are split and the interior inspected Following inspection in this manner the subsequent development of ovarian ancer is rarity Many women are cas trated to provide prophylactic protection to tremely few
2 When blood supply to the ovaries is protected by preservation of the tube and the avoidance of tension, few ovaries subsequently become cysti in the hysterectomized patient
3 Hysterectomy with conservation of ovarian tissue does not hasten the onset of ovarian failure or menopausal symptoms.
4 I seems illogical to substitute the symptoms f the menopause for those of pre menstrual tension or to assume that synthetic estrogen is safer or superior to that provided to the patient by nature

The e now appears to be laboratory evidence that the ovary continues to function long after t has lost ts ability to c eate an endometrium or produce ova If there is no danger to the patient in leaving the ovary and there is evidence of continued function after hysterectomy or the menopause conservation of the ovary may do much to ameliorate the symptoms of

1 Osteoporosis
2 Bladder Dysfunction
3 Atherosclerosis
4 Hypertension
5 Depressed Thyroid Activity

which seem to appear too f equently in the castrated patient

B Oophorectomy in malignant disorders of the breast and endometrium

The probable role played by estrogens in stimulation of cancers of endometrium and breast has been llustrated in controlled stud es in animals, and serves as one basis for hormonal therapy of inoperable cancer Sec etion of estrogens requires a gonadotropic st mulus but may take place either from the ovary or adrenal corte Both ACTH and gonadotropins have been shown to augment adrenocortical estrogen output (26 29) The gonadotropic stimulation to estrogen secretion may be inh bited either by hypophysectomy or synthetic estrogen or high dosage androgen therapy which both inh-bit pituitary function Cort sone or derivatives augment pituitary gonadotropin secretion causing ova ian estrogen synthesis. Corticoids, although they educe ACTH stimulation of the adrenal

cortex (30) may have l ttle effect upon the net amount of secreted estrogen in the normal female Oophorectomy seldom results in diminished estrogen output by removing the principal normal source of female sex steroids (25) A further reduction occurs when corticoids are administered in low doses sufficient to inhibit hypophyseal ACTH secretion (18 31) or if total adrenalectomy is performed. There is some experimental evidence that large doses of cortisone may antagonize the feminizing action of estrogens upon target organs (32) and menstrual d sturbances are frequent in women receiving cort sone in amounts larger than 100 150 mg per day

Oophorectomy was util zed over a half century ago by Beatson for palliation of inoperable breast cancer and more ecent stud es indicate a 15 45% incidence of remission. The palliative ef fects of androgenic and synthetic estrogenic agents for advanced breast cancer have been known since 1944 (33 34) Total adrenalectomy following or simultaneous with oophorectomy was shown by Huggins to have def nite palliative effects (35) but is *relatively ineffective without oophorectomy (36)*

Luft Olivecrona Ray and Pearson have noted objective remissions following procedures at tempt ng total hypophysectomy (37 38) Cortisone in doses of 37.5 100 mg per day have been required for the post-operative maintenance of adrenalectomized and hypophysectomized patients, along with thyroid hormone in the case of the latter group

Several reports indicate that objective remissions can be achieved in inoperable mammary cancer solely through administration of cortisone with or without dessicated thyroid, provided that **all patients under 65 have been oophorectomized** (20 39 43) Oophorectomy is not essential beyond 65 70 years of age The proportion of patients responding to this type of treatment and the duration of thei response appears comparable to the results of oophorectomy and adrenalectomy or hypophysectomy (20)

In our experience the highest incidence of remissions has occurred in those patients oophorectomized more than 6 months prior to cortisone administration, and in those with ovarian cortical stromal hyperplasia or metastases. Sixty-eight percent of all pat ents showed immediate objective benef ts as shown by decl ne in copper resistant serum acid phosphatase (44) decline in urinary calcium ex cretion (45) edema-free gain in weight recalcification of osseous metastases, or reduction in soft-tissue disease In one-third, the remission exceeded six months in duration, the longest remission now being 41 months in duration. The average remission lasts in excess of 7 months, and two and three and a half year remissions have been achieved No serious side effects have been encountered from the method of treatment descr bed, in which thyroid therapy has been added to the regimen 1 2 months *after corticoid therapy was initiated (20)*

One of the main objectives of this research has been to emphasize the probability of continued estrogen secretion by the intact post-menopausal or amenorrheic ovary which apparently inter feres with the effectiveness f cortisone therapy in advanced breast or endometrial cancer Those who failed to obtain therapeutic benef ts from this alternative program of cancer treatment have neglected these considerations

These results als may be of importance in a consideration of the apparent protective effect of estrogenic secretory act vity upon lipoprotein or cholesterol metabolism in relation to atherosclerosis, which begins to wane after cessation of menses Both serum lipoprotein and cholesterol levels reach maximum values in the sixth and seventh decades in females (46 49)

C **Research Applications**

Since over 80% of breast and endometrial cancer develop in individuals with ovarian cortical stromal hyperplasia (perhaps in response to an abnormal pituitary gonadotropic stimulus) (9 14 15) there is a possibil ty that this pathologic stat may be accompanied b/ abnormal estrogen secretory activity If the latter can be ult mat ly proven, by many more detailed and numerous clinical and biosynthetic studies, t may become possible to recogni and correct an abnormal hormonal environment which contributes to cancer of these organs, before carcinogenesis has occurred.

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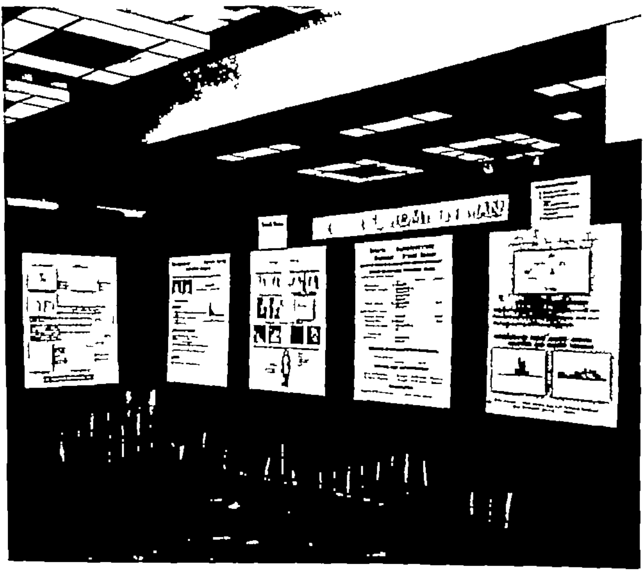
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Honorable Mention

EXPERIMENTAL MEDICINE AND THERAPEUTICS

Hypophysectomy in Man. Olof H Pearson Bronson S. Ray Mortimer B Lipsett Henry Hood and Ernest Greenberg, Sloan-Kettering Institute Memorial Center and New York Hospital, Cornell University Medical Center New York.

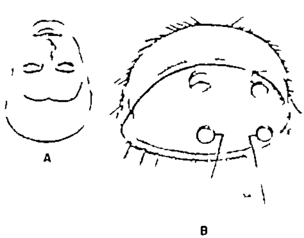
Five years of experience with removal of the pituitary gland in patients are summarized together with the surgical approach best suited to total removal of the pituitary The results of hypophysectomy in 109 patients with metastatic mammary cancer are presented as well as preliminary results of hypophysectomy in patients with other types of malignancy The physiological effects of hypophysectomy are shown. The endocrine management of patients after pituitary gland removal is outlined.



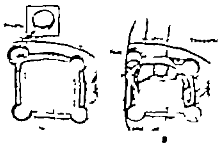
I TECHNIQUE OF HYPOPHYSECTOMY



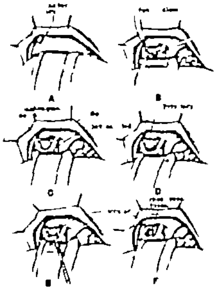
1 Sagittal diagram of hypophysectomy



2 Location of incisions (A) in the scalp and (B) in the skull.



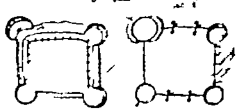
3 (A) Exposure of the dura after removal of the bone plate (a) the trephined bone button and (B) incision of the dura and exposure of the falx.



4 Steps after opening the dura and withdrawing cerebrospinal fluid (A) retraction of right frontal lobe and division of right olfactory nerve (B) severance of pituitary stalk; (C) exposure of diaphragma sellae (D) enlargement of opening in diaphragma sellae and placement of cotton pledget beneath chiasma (E) removal of pituitary gland and (F) exposure of hypophyseal fossa



5 Placement of rubber sponge in hypophyseal fossa and irrigation with Zenker's fluid to destroy any remaining fragments of pituitary gland



6 (A) Accurate closure of dura and (B) replacement of bone fragments and suture of temporal fascia

OPERATIVE MORTALITY 10 DEATHS IN 147 OPERATIONS — 7 PER CENT
MORBIDITY WITH SIGNIFICANT RESIDUALS 6 IN 147 OPERATIONS — 4 PER CENT

II MANAGEMENT OF THE PATIENT DURING AND AFTER SURGERY

Proper hormonal replacement after hypophysectomy results in a normal patient

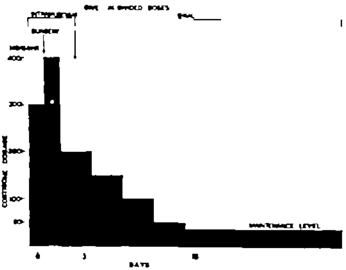
Therapy: Cortisone, 12.5 mgs. t. i. d.
Desiccated thyroid, 180 mgs. daily



Appearance after operation.

SURGERY

1 *High doses of cortisone are needed to meet the stress of surgery*



2. Diabetes insipidus can develop *rapidly* therefore, urine output checked hourly When excessive (> 150 cc. per hour) give pitressin tannate in-oil, 3 units I M. Duration of action, 1 to 4 days.

MAINTENANCE THERAPY

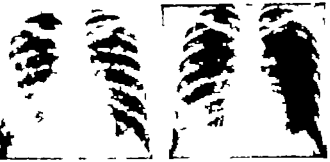
Cortisone 37.5 to 50 mg. daily in divided doses.

Desiccated thyroid 120 to 180 mgs. daily

If diabetes insipidus occurs posterior pituitary powder by nasal insufflation, 20 to 40 mgs. daily or pitressin tannate in-oil, 2 to 5 units I. M., every 2 to 4 days.

CAUTION *The hypophysectomized patient needs cortisone for survival Illness or any severe stress necessit tes increasing the dosage of cortisone.*

HYPOPHYSECTOMY INDUCED REGRESSION OF METASTATIC BREAST CANCER



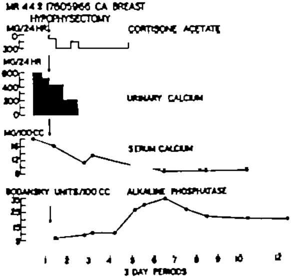
Regression of pulmonary metastases



Regression of pericardial metastases.



Regression of bone met stases.



Calcium changes after hypophysectomy



R gres ion of noperable brea t lesions



Meta t ses t nearly every org n it ha e been observed to regress mong this group of patients bone br st, l er (occa ionally) lun l ph nodes pericardium peritoneum, pleura retina skin, spinal metasta es with cord or caud pression.

IV RESULTS OF HYPOPHYSECTOMY IN METASTATIC BREAST CANCER

50 to 60 per cent of women of all ages obtained objective improvement.

EFFECT OF PREVIOUS ENDOCRINE STATUS

	Patients	*Remissions*	*Per Cent Remissions*
A. No previous ablative treatment			
Premenopausal	8	5	63
Spontaneous menopause	37	21	57
Induced menopause	18	8	44
B. Post therapeutic castration			
Castration remission	7	7	100
Castration failure	6	2	33
Castration unevaluated	12	6	50
C. Post castration and adrenalectomy	17	6	35

DURATION OF HYPOPHYSECTOMY REMISSIONS

Median: 8 + months Mean: 10 + months

RANGE OF REMISSIONS TO DATE: 2 to 30 months

19 of 53 patients are still in remission for 8 to 25 months.

SURVIVAL POST HYPOPHYSECTOMY

	Mean	*Range*	*Living*
Remissions (53 patients)	13 + months	3 to 33 + months	30 patients
No response (47 patients)	5 months	1 to 14 months	2 patients

REHABILITATION

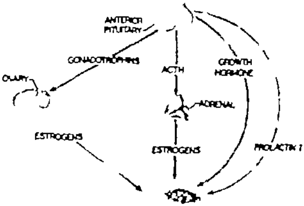
43 of 53 patients in remission were able to resume normal activities.

REASONS FOR HYPOPHYSECTOMY

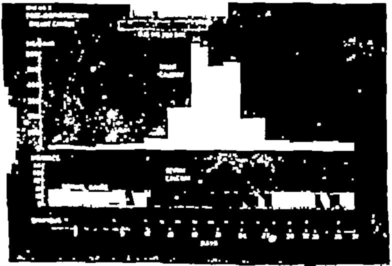
Suppression of estrogen secretion from ovaries and accessory ovarian tissue.

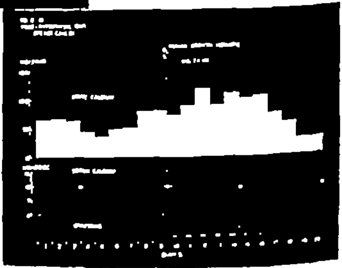
Suppression of estrogen secretion from adrenals and accessory adrenal tissue.

Elimination of pituitary growth hormone and prolactin.



STIMULATION OF BREAST CANCER GROWTH BY ESTROGENS AND GROWTH HORMONE

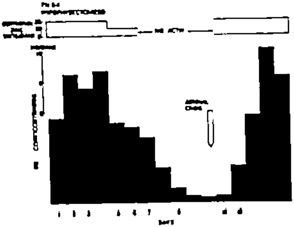




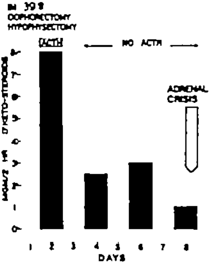
An increase in urine calcium signifies increased breakdown of bone and thus increased growth of tumor

VI. PHYSIOLOGICAL EFFECTS OF HYPOPHYSECTOMY

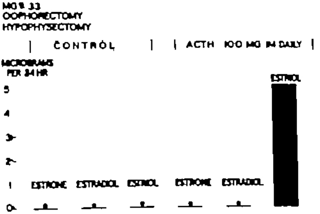
ADRENAL FUNCTION IN THE ABSENCE OF ACTH



1. HYDROCORTISONE SECRETION STOPS.
Clinical correlation: adrenal crisis develops.

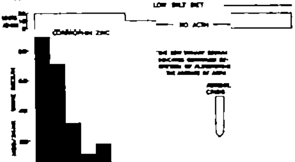


2. ADRENAL ANDROGEN SECRETION STOPS.
Clinical correlation diminished growth of axillary and pubic hair



3. ADRENAL ESTROGEN SECRETION STOPS.
Clinical correlation none apparent.

4. ALDOSTERONE SECRETION *NOT* AFFECTED.
Clinical correlation normal adjustment to low salt diet.



GONADAL FUNCTION IN THE ABSENCE OF GONADOTROPHINS

URINARY GONADOTROPHINS DISAPPEAR. ESTROGEN AND PROGESTERONE SECRETION SUPPRESSED.

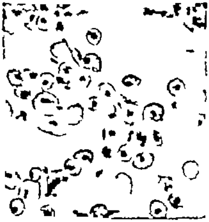
Clinical correlation menses stop menopausal symptoms may occur but usually minimal.



Cornified

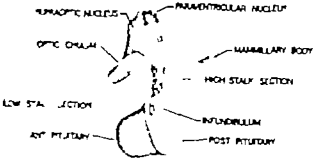
VAGINAL

SMEARS



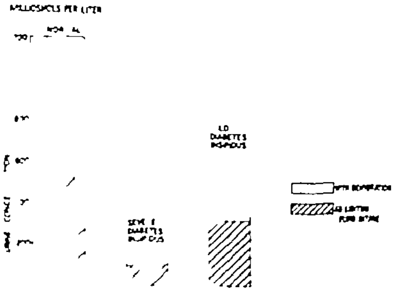
Atrophic

ANTIDIURETIC HORMONE IS PRODUCED AND SECRETED BY THE HYPOTHALAMIC PARS NERVOSA SYSTEM.



Interruption of the hypothalamic pars nervosa system leads to diabetes insipidus. The higher the stalk section the more severe the diabetes insipidus.

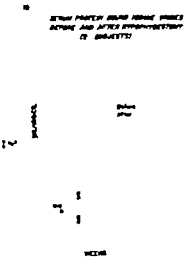
ANTIDIURETIC HORMONE IS NECESSARY FOR CONCENTRATION OF THE URINE.

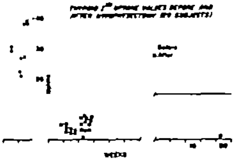


THYROID FUNCTION

THYROID HORMONE SECRETION IS SUPPRESSED.

Clinical hypothyroidism usually develops in 2 to 6 months.





INDICATIONS FOR HYPOPHYSECTOMY

1 metastatic breast cancer
2 acromegaly unresponsive to x ray therapy
3. other pituitary tumors
4 ? diabetes mellitus with vascular complications
5 ? metastatic prostate cancer

The authors wish to acknowledge the referral of patients for hypophysectomy by the Breast Service Memorial Hospital, Norman Treves, M.D Chief

The authors are also indebted to many other colleagues for collaboration in these studies Drs. C P Rhoads, Henry T Randall, Frank Adair Rulon W Rawson, Charles D West, M. C. Li, John P Maclean, John Finkbeiner George Escher nd Ernest Schwartz; Miss Constance Swedlin, Mrs. Lois Stroub, Miss Marie Restuccia, and Miss Dorothy Sellitto.

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2 Ray B. S and Pearson O H Hypophysectomy in the treatment of advanced cancer of the breast *Ann Surg* 144 394 1956

3 Luft R Olivecrona H and Sjögren B Hypophysectomy in man experiences in severe diabetes mellitus *J Clin Endocrinol and Metab* 15 391 1955

4 Luft R and Olivecrona H Hypophysectomy in the management of neoplastic disease *Bull New York Acad Med* 33 5 1957

5 Lipsett M B and Pearson O H Effects of hypophysectomy in man, *M Clin. North America* 10 773 1956

6 Li M C Rall J E Maclean J P Lipsett M B Ray B S and Pearson, O H Thyroid function following hypophysectomy in man, *J Clin. Endocrinol and Metab* 1 12 8 1955

7 Lipsett M B West C D and Pearson, O H Adrenal function after hypophysectomy in man, *J Clin Endocrinol and Metab* 17 356 1957

8 Maclean, J P Lipsett M B Li M C West C D and Pearson O H Regulation of salt metabolism after hypophysectomy in man *J Clin. Endocrinol and Metab* 17 346 1957

9 Lipsett M B Maclean, J P West C D Li, M C and Pearson, O H An analysis of the polyuria induced by hypophysectomy in man, *J Clin. Endocrinol and Metab* 16 183 1956

10 Lipsett M B and Pearson O H Further studies of diabetes insipidus following hypophysectomy in man *J Lab and Clin Med* 49 190 1957

11 Lipsett M B Li M C and Pearson O H Medical management of adrenalectomy and hypophysectomy *Arch Int Med* 98 634 1956

12 Pearson, O H Li M C Maclean, J P Lipsett M B and West, C D Management of metastatic mammary cancer *J A M A* 159 1701 1955

Honorable Mention

EXPERIMENTAL MEDICINE AND THERAPEUTICS

The Effect of Prednisone in the Treatment of Resistant Cardiac Edema. Allen D Riemer University of Colorado School of Medicine Denver

Early clinical investigation with prednisone demonstrated rapid diuresis in almost all of the cases which were complicated by cardiac edema. Eventually that finding was applied as adj ctive treatment for refractory cardiac patients who had no apparent indication for use of steroids. The results were prompt diuresis marked potentiation of cardiac drugs, and restoration of compensation. Summary studies are demonstrated with special reference to alteration of electrolytes a d water excretion after admin istration of prednisone



BIBLIOGRAPHY

1 Pearson O H Ray B S Harrold C C West C D Li, M C. Maclean, J P., and Lipsett, M B Hypophysectomy in the treatment of advanced cancer *Tr A Am Physicians* 68 101 1955

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3 Luft, R Olivecrona H and Sjogren, B Hypophysectomy in man experiences in severe diabetes mellitus *J Clin Endocrinol and Metab* 15 391 1955

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5 Lipsett M B and Pearson O H Effects of hypophysectomy in man, *M Clin North America* 10 773, 1956

6 Li M C Rall J E Maclean J P Lipsett M B Ray B S and Pearson, O H. Thyroid function following hypophysectomy in man, *J Clin Endocrinol and Metab* 15 1228 1955

7 Lipsett M B West C D and Pearson, O H Adrenal function after hypophysectomy in man, *J Clin Endocrinol and Metab* 17 356 1957

8 Maclean J P Lipsett M B Li M C West C D and Pearson, O H Regulation of salt metabolism after hypophysectomy in man *J Clin Endocrinol and Metab* 17 346 195

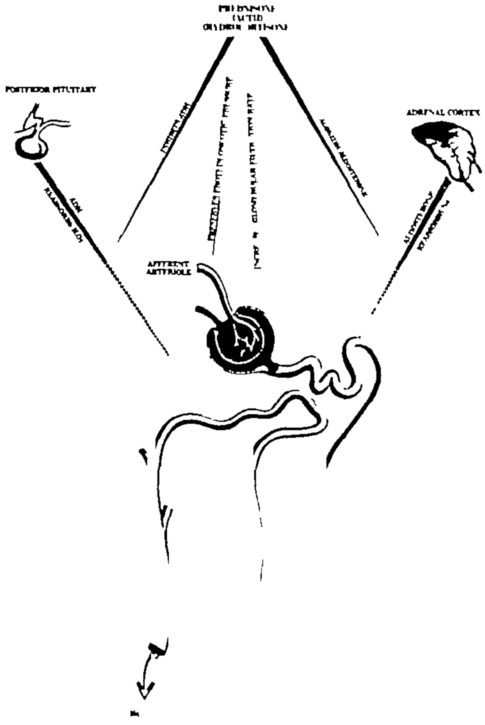
9 Lipsett M B Maclean J P West C D Li, M C and Pearson, O H An analysis of the polyuria induced by hypophysectomy in man *J Clin Endocrinol and Metab* 16 183 1956

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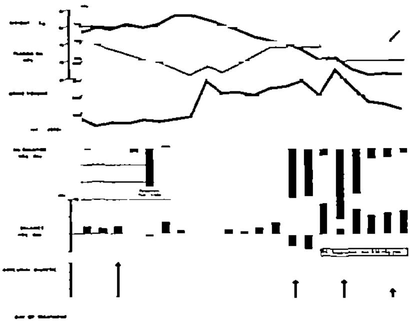
12 Pearson O H Li M C Maclean J P Lipsett M B and West C D Management of metastatic mammary cancer *J A M A* 159 1701 1955

PROBABLE MECHANISM OF CORTICOSTEROID—INDUCED DIURESIS

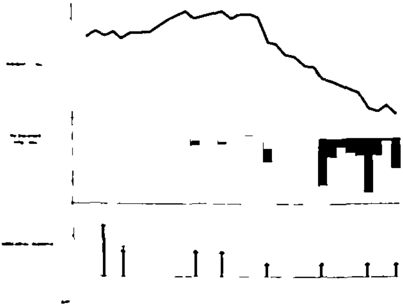


CLINICAL EVIDENCE OF DIURETIC ACTION BY CORTICOSTEROIDS

Paradoxical diuretic effect of corticosteroids originally observed following the use of ACTH in resistant cardiac failure

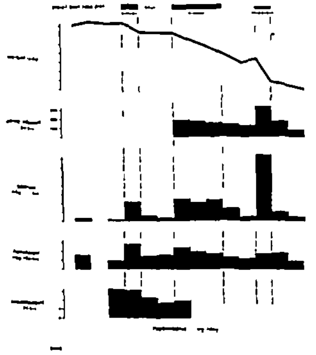


Male 69 years old, arteriosclerotic heart disease with refractory congestive failure. Note diuresis and weight loss beginning on fifth day of ACTH therapy and reactivation of the mercurial diuretic with sharply increased losses of sodium, water and weight.



Male 63 years old, arteriosclerotic heart disease with refractory congestive failure. Note increased natriuretic responses to the mercurial diuretic during and especially after ACTH therapy.

Following the development of "electrolyte stable" prednisone, many more observations of steroid induced diuresis have been reported.



Female, 66 years of age, refractory cardiac failure, etiology not stated. After prednisone, formerly ineffective Diamox and Thiomerin produced marked excretion of sodium and water. The diuretics plus prednisone lowered aldosterone excretion more than prednisone alone. The same diuretics without prednisone usually increase aldosteronuria.



Female, 62 years old, pulmonary fibrosis with evidence of severe pulmonary edema. Six days of oxygen, digitalis, and mercurials produced no change. The institution of Meticorten was followed by prompt diuresis and marked relief of dyspnea.

In a series of 13 cases with various disorders accompanied by heart disease and edema, Meticorten therapy was instituted specifically for the non-cardiac conditions. Only three had previously had cortisone Significant diuresis and weight loss usu ally beginning on the fourth to seventh day was recorded in 11 of these cases. This response occurred despite absence of diuretic drugs in 7 of them.[14]

4 Bickerman, H , et al The use of prednisone (Meticorten) in respiratory disease. II Pulmonary emphysema and pulmonary fibrosis J Chron Dis. 347 1955

10. Camara, A and Schemm, F Corticotropin (ACTH) in heart disease Its paradoxical effect on sodium excretion in resistant congestive failure Circulation, 11 702, 1955.

13. Hodara, G. and Schemm, F The clinical use of corticotropin (ACTH) and adrenal corticosteroids in the therapy of intractable edema. Am. J. Med. Sciences 230 621, 1955.

14. Hamer A Clinical investigations with Meticorten, 1955.

16. Muller A., et. al. Etude de l'aldosteronurie chez le sujet normal et chez le cardiaque oedemateux. I. Effets de variations de l'apport en chlorure de sodium. J. Suisse de Medicine. 42 1262, 1956.

EFFECTS OF PREDNISONE (METICORTEN) USED SPECIFICALLY TO AID DIURESIS IN RESISTANT CARDIAC EDEMA CASES*

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]			Not Taken	[illegible]			Patient Died	[illegible]
	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
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	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Not Recorded	Not Recorded	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

In the cases there were no cases of inflammatory or generalized collagen disorders for which prednisone might have been a specific agent. Superior effects obtained with prednisone in 6 cases of rheumatic heart disease and in 3 cases of asthmatic cor pulmonale are not included in this series.

All of the patients listed had had prolonged but eventually ineffective intensive cardiac and diuretic therapy. Electrolyte balance studies showed no correlation with the degree of edema. Only two of the patients had significant imbalance, but correction to normalcy did not improve their clinical status.

After addition of prednisone, full cardiac therapy with supplementary potassium was maintained in all of the cases. Especially important was the continuation of diuretic drugs which resulted in immediate beneficial diuresis, even with small doses of prednisone. In the previous series 14, the diuretic effect was somewhat delayed after larger doses of prednisone alone.

**No patient in this series developed glycosuria to aid the increase of water output.

†There was no previous therapy with "sodium-retaining" steroids in this series.

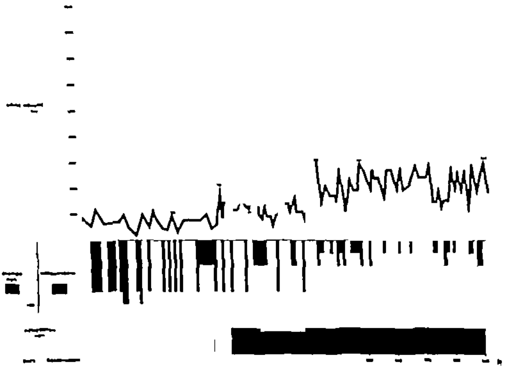
††Limited to include time of maximum diuretic effect.

‡Functional Classification of Heart Disease, New York Heart Association.

12. Riemer A. The effect of prednisone in the treatment of refractory cardiac edema. Bull. Johns Hopkins Hosp. [illegible]

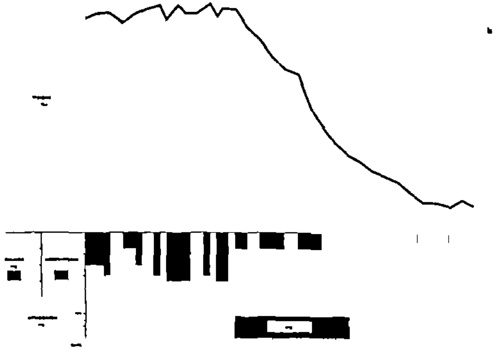
14. Riemer A. Clinical investigations with Meticorten, 1955.

23. Riemer A. Current investigations



CASE NO 1

J.P male, 47 years old, coronary sclerosis with myocardial infarcts and refractory anasarca. After Meticorten, previously ineffective diuretics produced marked losses of water. With 15 mg Meticorten daily and sparse doses of Diamox, compensation was maintained for more than one year. Finally sudden chaotic rhythm and death occurred. Autopsy revealed no evidence of venous congestion or edema. (Riemer [illegible] The effect of prednisone in the treatment of refractory cardiac edema. Bull. Johns Hopkins Hosp. [illegible] 442, [illegible])



CASE NO 2

S.S female, 71 years old, arteriosclerotic heart disease with refractory anasarca. With Meticorten there was pronounced restoration of diuretic action from Diamox. Note especially the very small doses of the steroid, the maximum being 7.5 mg /day! (Riemer [illegible] Current investigations)

SUMMARY OF CURRENT INVESTIGATIONS

EFFECT OF CORTICOSTEROIDS ON CARDIAC, RENAL, HEPATIC AND NUTRITIONAL EDEMAS[9]

ELECTROLYTE STUDIES

- competition by various steroids to create diuresis[17, 18]
- role of aldosterone[19, 20, 21]
- "critical levels" of prednisone for sodium retention[22]
- required dosage and duration of prednisone therapy[23]

SUGGESTED FIELDS OF STUDY

INTRACELLULAR ELECTROLYTE EXCHANGE

- measurements in muscle biopsies
- extended tracer studies with K^{42} [24]

ENDOCRINE MECHANISMS

- thyroid
- growth hormone
- antidiuretic hormone (ADH)
- vasoexcitor material, vasodepressor material

RENAL TUBULAR ENZYMES

- activity of carbonic anhydrase and succinic dehydrogenase systems when mercurials and acetazolamide are "re-activated"

ROUTINE APPLICATION OF PREDNISONE FOR CARDIAC EDEMA IS NOT NOW BEING ADVOCATED!

There are many complexities about which more knowledge is needed.

[illegible]

20 Mach R [illegible] and Fabre J Clinical and metabolic effects of aldosterone [illegible] Endocrinology [illegible]

Bartter F C The role of aldosterone in normal homeostasis and in certain disease states Metabolism [illegible]

22 Unpublished data

23 Hauser A Current investigations

24 [illegible] J and F [illegible] H Exchanges in potassium content of the [illegible] in congestive [illegible] changes during treatment Circulation [illegible]

Biochemical Biopsy Felix Wróblewski Sloan-Kettering Institute of Memorial Center New York.

Enzymology and its application to clinical problems is not new. The recent extensions of enzyme studies to various disease states has pointed up the more precise diagnoses which result when enzymologic studies are brought to bear on clinical problems. Tissues and specific pathologic states of these tissue may be characterized not only by their cellular flora and reaction, but in some cases by their enzyme patterns. These enzymatic tissue alterations may precede, parallel or follow the histologic changes in disease states. The tissue involved may be biochemically biopsied via the blood stream and other body fluids. The further extension of thi concept of biochemical biopsy would appear to be potentially promising area for further study

BIOCHEMICAL BIOPSY

The identification of normal and diseased tissues by histologic configuration of biopsied specimens is a recognized and useful approach to diagnosis. Tissue diagnosis by morphologic characterization serves to identify both the organ site a d the abnormal tissue reaction such as inflammation, neoplasia or degeneration. This is done in part by making use of the cellular and intercellular characteristics of the tissue examined. It would appear that the morphologic flora of tissues may have a counterpart i their enzymatic flora and the biochemical composition may at times be as characteristic f tissues as their cellular rchtecture. In add tion, various diseases may result in enzymatic tissue alterations as profound as the mo phologic changes identified with nflammatory neoplastic and degenerative states. Short of biopsy the disease of an organ may t times be nferred from the examination f accessible body flu ds. Just as localized nflammation in an rgan may be reflected peripherally by a morphologic change such as an increase n the circulating leukocytes, so t ssue insults may esult in equally impressive enzymatic alteration n the blood stream and other body fluids. The morphologic reflections of tissue reactions t disease appear t times to have their counterpart in biochemical or enzymatic alterations in the tissues. These enzymatic tissue changes find reflection in comparable enzyme systems of the blood and other body fluid and alter body flu d enzyme acti ity primarily by three processes. 1) Necrosis f tissue results in release of intracellular enzymes which find access to the body fluids. 2) Increased serum enzyme acti ity may be accou ted for by the release f intracellular enzymes from necrotic cells nd the simultaneous disturbance in the normal handling of tissue en yme so that the quantitative increase in blood enzymes is out of proportion to the enzyme expected to be released by tissue necrosis. This may occur by virtue of disturbed excretion, elaboration other physiologic handling of t ssue en ymes d ring the pathologic state f an organ. 3) Tissue enzyme alterations may increase the body fluid enzyme acti ity by exudation f intracellular enzymes elaborated by m ltiplying mal gnant cells, but unrelated to tissue necrosis.

CONCEPT
OF BIOCHEMICAL BIOPSY

1. A tissue may be characterized by its enzymatic as well as its cellular composition
2. Morphologic reflections of tissue reactions to degenerative infectious and neoplastic disease states may have their counterpart in enzymatic alterations in and about the tissue involved
3. The enzymatic tissue changes may find reflection in comparable enzyme changes in the body fluids which traverse and/or bathe the tissue
4. Correlation of clinical facts with quantitative and serial enzyme changes of body fluids contribute to the differential diagnosis of disease states.

NORMAL RANGE OF ACTIVITY IN BODY FLUIDS OF SEVERAL SELECTED ENZYMES

ENZYMES	ABBREVIATIONS	SERUM (UNITS)	CEREBROSPINAL FLUID (UNITS)	EFFUSION
Amylase	Amyl	40-200		
Acid Phosphatase	Ac-P	0 0-1 0		In the absence of malignant cellular constituents effusion enzyme activity is less than the corresponding enzyme activity of the serum
Alkaline Phosphatase	Ak-P	1.5-4 0		
Glutamic-oxalacetic Transaminase	GO-T	8-40	0-25	
Glutamic pyruvic Transaminase	GP T	5-35	0-23	
Lactic Dehydrogenase	LD	200-680	5-40	

MECHANISMS

Mechanisms of Serum and Plasma Enzyme Alterations

1. Necrosis of tissue results in release of intracellular enzymes which find access to the blood stream.
2. Necrosis and inflammation of tissue results in release of intracellular enzymes which are transiently excreted secreted or otherwise handled abnormally
3. Cancerous transformation of tissues results in the exudation of intracellular enzymes during abnormal cellular growth in the absence of necrosis.

Mechanisms of Serous Effusion Enzyme Alterations

1. Serous effusions show less enzyme activity than the serum activity of the respective enzyme measured concomitantly
2. Necrosis of tissue results in release of intracellular enzymes which find access into bathing effusion.
3. Lymphomatous, leukemic or cancerous cells exude intracellular enzymes into the bathing peritoneal or pleural fluid.

Mechanisms of Cerebrospinal Fluid Enzyme Alterations

1. Necrosis of tissue results in release of intracellular enzymes which find access to spinal fluid.
2. Inflammation of meninges increases permeability of brain vascular tree compromises blood-brain barrier and permits enzyme-richer plasma to increase spinal fluid enzyme activity
3. Thrombosis and rupture of brain vascular tree circumvents blood-brain barriers and permits enzyme-richer plasma to increase spinal fluid enzyme activity
4. Lymphomatous, leukemic, or metastatic cancerous tissue in the brain exudes intracellular enzyme into the bathing cerebrospinal fluid.

CONCEPT
OF BIOCHEMICAL BIOPSY

1. A tissue may be characterized by its enzymatic as well as its cellular composition
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Alkaline Phosphatase	Ak-P	1.5-4 0		
Glutamic-oxalocetic Transaminase	GO-T	8-40	0-25	
Glutamic-pyruvic Transaminase	GP T	5-35	0-23	
Lactic Dehydrogenase	LD	200-680	5-40	

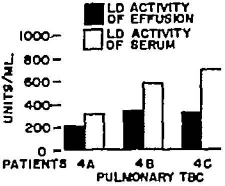
Organ Differentiation by Enzyme Alterations—*In Infectious Disease*

Meningitis

Type of MENINGITIS	*CSF LD (Units/ml)*
Tuberculous	270
Pneumococcus	360
Meningococcus	480
Undetermined	130

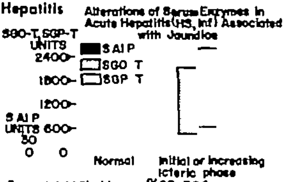
CSF LD 50-550

Tuberculous Pleural Effusion



S LD greater than Eff LD

Hepatitis



Serum total bilirubin mgm% 20-30 4

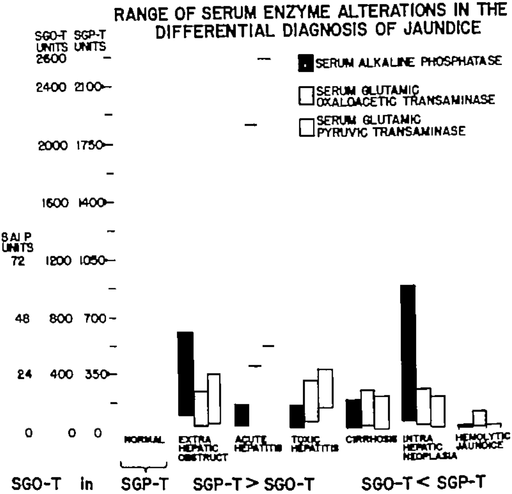
S GO-T and S GP T markedly elevated

S Ak-P and S LD minimally elevated

Dermatomyositis

S GO-T and S LD elevated

Etiologic Differentiation of Jaundice by *Serum Enzyme Alterations*

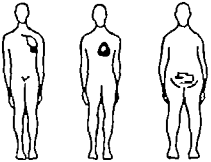


Etiologic Differentiation of Central Nervous System Disease *by Cerebrospinal Fluid Enzyme Alterations*

Disease States	Range of CSF LD	Range of CSF GO-T		Range of CSF LD	Range of CSF GO-T
Degenerative	Normal	Normal	Subarachnoid Hemorrhage	200 500	240 290
Meningitis	50 700	20 480	Trauma	Normal	Normal
Thromboembolic	20 50	20 82	Metastatic Malignant Neoplasia	50 540	20 44
Seizures	Normal	Normal	Primary Brai Neoplasia	Normal?	Normal?

Etiologic Differentiation of Serous Effusions
by Comparison of Serum and Effusion Enzyme Activity

Effusions With Cytologically Benign Cellular Constituents



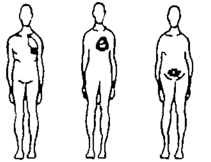
pleural *pericardial* *peritoneal*

myxedema
cirrhosis
tuberculosis
congestive heart failure

serum { A -P, Ak-P, Amyl, GO-T, GP T } greater than respective effusion enzyme activity

S LD Greater Than Eff LD

Effusions With Cytologically Malignant Neoplastic Cellular Constituents



pleural *pericardial* *peritoneal*

metastatic carcinoma and lymphoma involving the serous surfaces and spaces

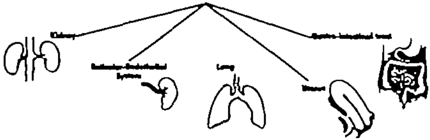
serum { Ac-P, Ak-P, Amyl, GO-T, GP-T } greater than respective effusion enzyme activity

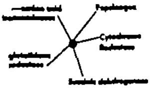
Eff LD Greater Than Serum LD

POTENTIAL DIAGNOSTIC EXTENSIONS—*VIA FLUIDS*

Biochemical Biopsy Via *Other Enzymes* in Body Fluids

May pinpoint diseases in other organs and systems





May permit identification of other etiologic factors

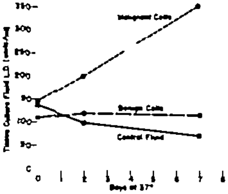


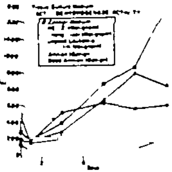
	S GO-T units/ml serum	S GP-T units/ml serum
Normal Newborn Infants	3–120	3–90
Physiological Jaundice	3–120	3–90
Hemolytic States a) Mild to Severe	3–120	3–90
b) Very Severe	Temporary rise to about 400	3–90
Atresia Bile Ducts Inspissated Bile Syndrome	Sustained rise to about 300–800	Sustained rise to about 300–800
Neonatal Hepatitis	Sharp rise in increasing icteric phase (anticipated)	Sharp rise in increasing icteric phase (anticipated)

Preliminary observations on levels of activity of serum glutamic oxaloacetic transaminase (S GO-T) and serum glutamic pyruvic transaminase (S GP-T) in newborn infants with the clinical syndrome of jaundice. Kove, Goldstein, & Wroblewski.

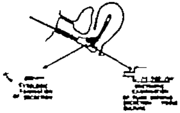
Biochemical Biopsy Via Fluid Bathing Tissue in Culture

1 Malignant neoplastic cells in tissue culture exude or contribute LD into fluid medium which bathes the cellular elements.





2. Exfoliated cells contained in secretions may be planted by tissue culture technique and enzyme changes of medium used to distinguish malignant from non-malignant cellular constituents in the absence of cytologic identification.

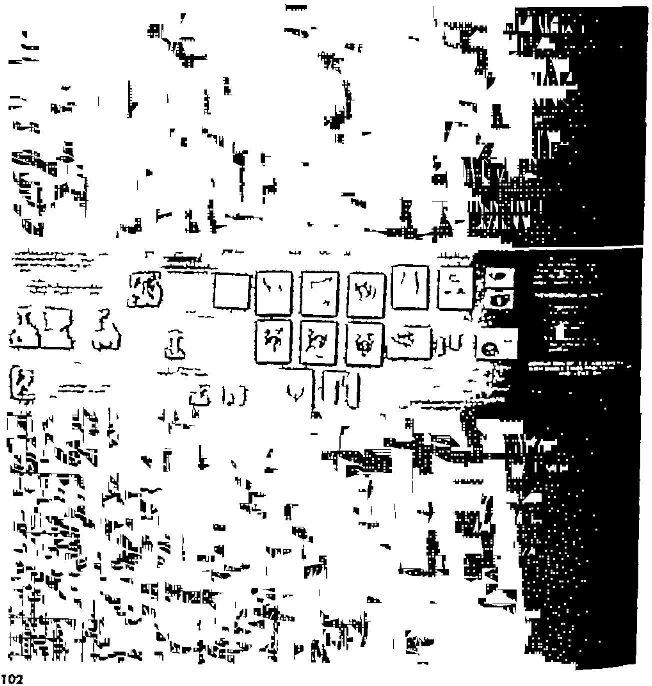


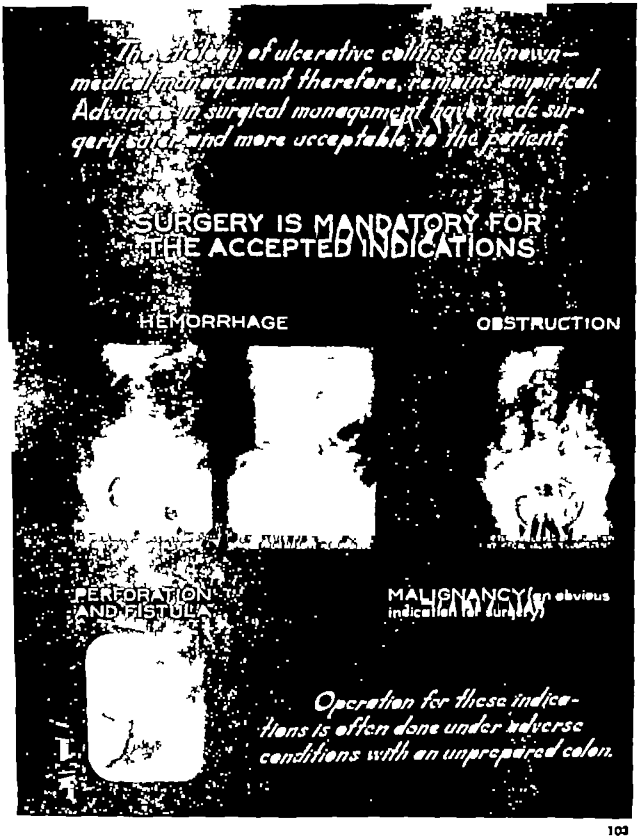
Biopsy tissue specimens may be planted by tissue culture technique, and enzyme changes in bathing medium used to distinguish premalignant from normal tissue

Illustrative clinical material has been deleted due to space limitations Booklet facsimile of exhibit available upon request from author

Surgical Management of Ulcerative Colitis. Lucius D Hill Caleb S. Stone Jr and Clarence C. Pearson the Mason Clinic, Seattle.

Medical management of ulcerative colitis remains empirical since the etiology of the disease is unknown. In the past surgery was reserved only for complications such as hemorrhage perforation, carcinoma or obstruction. Experience has demonstrated that more emphasis must be placed on intractability and threat of cancer as indications for surgery. Examples of complications with case historie and specimens are shown. Patients showing intractability and cancer are also presented. The recent advances in surgical management of ulcerative colitis are presented with the emphasis on the one stage proctocolectomy. The experience with our operation for the removal of the entire colon and rectum through an abdominal incision is illustrated. The newer type of ileostomy which has eliminated many of the complications of ileostomy is demonstrated by photographs and drawings.

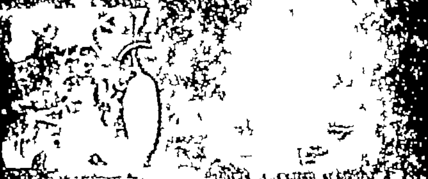



The etiology of ulcerative colitis is unknown—
medical management therefore, remains empirical.
Advances in surgical management have made surgery safer and more acceptable to the patient.
SURGERY IS MANDATORY FOR THE ACCEPTED INDICATIONS
HEMORRHAGE
OBSTRUCTION
PERFORATION AND FISTULA
MALIGNANCY (an obvious indication for surgery)
Operation for these indications is often done under adverse conditions with an unprepared colon.

Earlier elective operation is indicated for intractability and to avoid malignancy.

INTRACTABILITY

A. Rapid deterioration under adequate medical management.

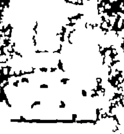




B. Chronic deterioration with adequate management.

RADIOLOGIC EVIDENCE INDICATED BY

1. Shortening of colon
2. Terminal ileum involved
3. Loss of haustrations



CLINICOPATHOLOGIC EVIDENCE

1. Continuing diarrhea
2. Inability to maintain weight and strength
3. Continued activity seen by sigmoidoscopic examination



Colon destroyed and largely replaced by fibrosis

C. [illegible] arthritis, hepatitis & psychosis.

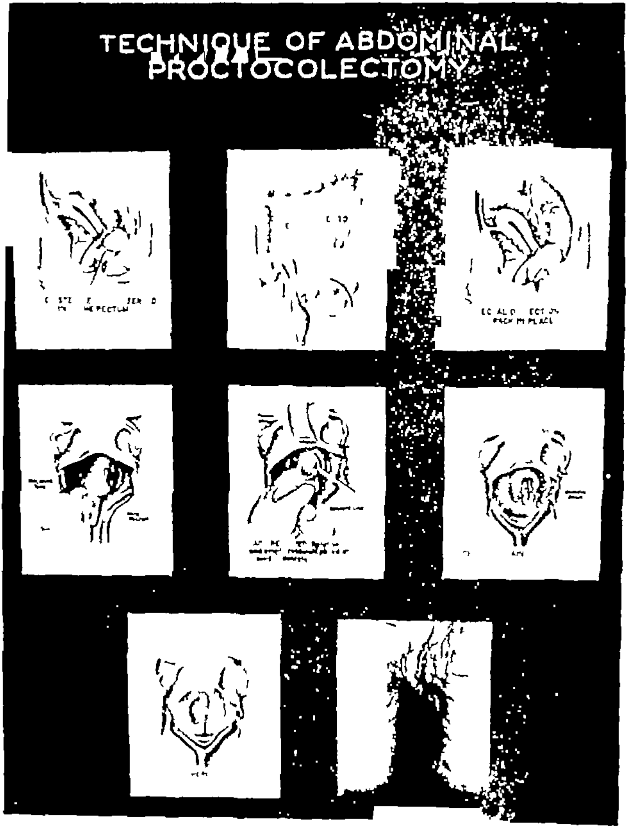
RISK OF MALIGNANCY

Operation must be done before malignancy develops. Threat of malignancy is suggested by:

1. Disease of long duration
2. [illegible]
3. Pseudopolyposis

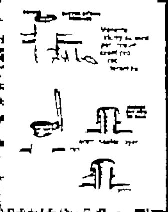





TECHNIQUE OF ABDOMINAL PROCTOCOLECTOMY

ILEOSTOMY
TECHNIQUE







NECESSARY EQUIPMENT





Most complications are due to ill-fitting appliance which allows leakage with skin irritation.

Dilatations & irrigations are unnecessary in newer type ileostomy.

Close follow-up with patient for a prolonged period is mandatory

Patient can be assured of a near normal life with well managed ileostomy.

Elective single stage abdominal proctocolectomy and ileostomy is the operation of choice in chronic ulcerative colitis. Surgery must be done before the patient deteriorates or malignancy develops, if maximum rehabilitation is to be obtained.

NEWER SURGICAL METHODS HAVE:

1. Eliminated multiple operations and anesthetics.
2. Decreased complications associated with the ileostomy.
3. Eliminated the posterior wound, leaving the patient with a normal perineum.

COMPARISON OF 16 STAGED OPERATIONS WITH SINGLE STAGE PROCTOCOLECTOMY AND ILEOSTOMY

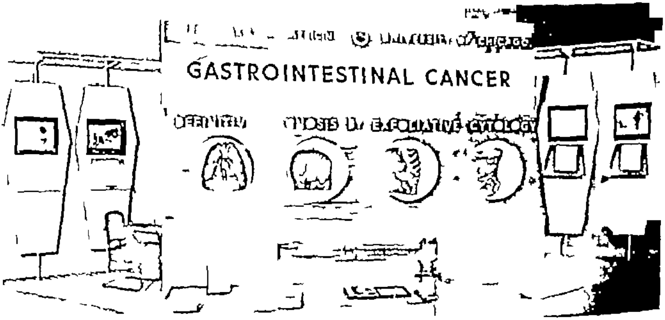
	NO CASES	AV NO OPERATIONS	AV HOSP DAYS	COMPLICATIONS	DEATHS
STAGED OPERATION (prior 1953)	16	3.3	92.2	5	2
1 STAGE PROCTOCOLECTOMY	16	1	49.2	2	1
[illegible] SINGLE STAGE PROCTOCOLECTOMY	10	1	21.6	1	0

Certificate of Merit

GASTROENTEROLOGY AND PROCTOLOGY

Gastrointestinal Cancer: Definitive Diagnosis by Exfoliative Cytology Howard F. Raskin, Joseph B. Kirsner, Walter L. Palmer, Sylvia Pleticka and Willard Yarema, University of Chicago, the School of Medicine, Chicago.

This exhibit illustrates the method of obtaining malignant cells by exfoliative cytologic techniques from the esophagus, stomach, duodenum and colon. Since there is variation in procedure with respect to these four areas, the exhibit will include four automatic projection lanterns showing the techniques involved with descriptive caption. In addition, representative case histories and examples of malignant cells from the esophagus, stomach, etc., will be shown. Four plastic manikins of the esophagus, stomach, duodenum (pancreas) and colon containing *small carcinomas are displayed with various tubes in place so as to stimulate the actual situation* in vivo. A microscope, cytology slides, and other paraphernalia are included.



Intubation

With the patient sitting upright an 18 Fr rubber Levin tube is passed through the mouth into the esophagus An attempt is always made to pass beyond any obstruction and enter the cardia If however the point of obstruction hinders further passage of the tube the lavage is begun at this level In most cases the tube can be placed at the cardia

The Esophageal Swallow

With the tip of the Levin tube located at the cardia the patient is given 100 cc of isotonic saline solution to swallow slowly As the fluid is swallowed gentle aspiration with a 100 cc syringe is maintained The material thus obtained is termed the esophageal swallow and represents a sampling of the entire esophagus

Esophageal Lavage

After the esophageal swallow the tube is withdrawn 3–5 cm The area at this point is washed with 20–40 cc of saline solution This procedure is repeated by degrees until the upper esophagus is reached If there is an obstruction the fluid aspirated will very nearly approximate the amount instilled More often much of the solution will be lost and a fluid return of one-half the amount of solution injected is to be expected More fluid may be recovered if the patient holds a deep breath while the water is instilled and aspirated

When the return is inadequate the tube may be passed into the stomach following the esophageal lavage and the fluid lost can then be aspirated This material should be placed on a separate slide since it will be contaminated with cellular material from the stomach

ESOPHAGEAL CYTOLOGY RESULTS

TOTAL CASES	CLINICALLY BENIGN	CYTOLOGY NEGATIVE	CYTOLOGY FALSE POSITIVE	ACCURACY PERCENT NEGATIVE	CLINICALLY MALIGNANT	CYTOLOGY POSITIVE	CYTOLOGY FALSE NEGATIVE	ACCURACY PERCENT POSITIVE
121	68	67	1	98	53	50	3	94



Model illustrating an infiltrative squamous cell carcinoma of the esophagus A #18 Levin tube is in place preparatory to irrigation

Intubation

Intubation of the stomach for cytologic studies is a procedure well tolerated by patients An iced 18 Fr rubber radio paque Levin tube is readily handled by the cytotechnicians With the patient sitting in an upright position the Levin tube is placed in the back of the mouth The gastric tube is passed a distance of 60 cm from the incisor teeth and the patient is asked to refrain from swallowing saliva and to hold the tube in one corner of his mouth to avoid excessive gagging

Gastric Lavage

There are two separate lavages. The first wash eliminates excess mucus and other debris, the second being the cleaner of the two contains most of the best preserved exfoliated cells

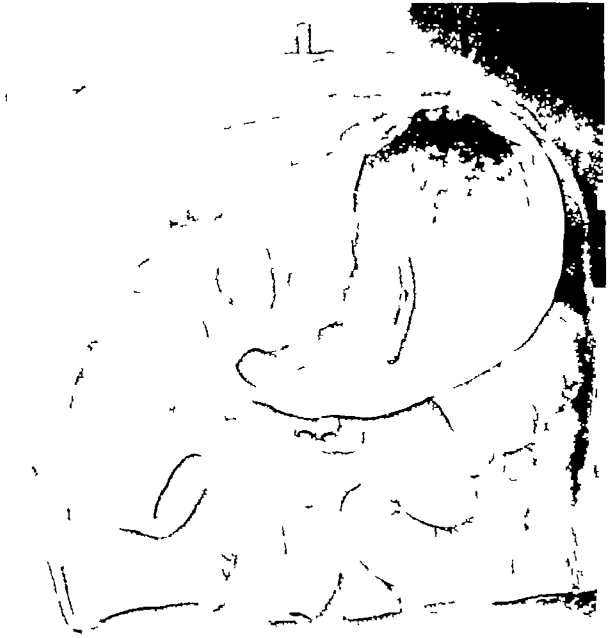
A saline solution is used in the first wash A total of 300 cc. of the saline solution is instilled into the stomach with a 100-cc. syringe. The fluid is then barbotaged back and forth *vigorously* for 3 minutes, with frequent relocation of the gastric tube The constant movement of the water in the stomach removes the protective layer of mucus from the gastric wall and exfoliation of gastric cells is enhanced

Now the saline solution is aspirated and placed in 50-cc. plastic centrifuge tubes which are immersed in an ice-water bath If all the fluid cannot be recovered the tube is moved back and forth until most of the fluid is aspirated The collected aspirate is centrifuged at 5 000 rpm for 2 minutes, and the resulting sediment is smeared on glass slides which are then fixed in ether-alcohol.

Sodium acetate buffer (pH 5.5) is used for the second wash 500 cc of the buffer are injected rapidly into the stomach The patient is placed on his right side for 2 minutes and then rotated 90 degrees in a clockwise direction every 2 minutes While the patient is lying on his back, the abdomen is massaged to aid further the exfoliation of cells A complete rotation requires 8 minutes and results in a greater surface area of the stomach being thoroughly washed To recover the buffer the patient is placed on his left side and gentle suction applied The aspirate is prepared in the routine manner

GASTRIC CYTOLOGY RESULTS

TOTAL CASES	CLINICALLY BENIGN	CYTOLOGY NEGATIVE	CYTOLOGY FALSE POSITIVE	ACCURACY PERCENT NEGATIVE	CLINICALLY MALIGNANT	CYTOLOGY POSITIVE	CYTOLOGY FALSE NEGATIVE	ACCURACY PERCENT POSITIVE
501	403	400	3	99	98	93	5	95



Manikin of the stomach depicting an ulcerating lesion on the lesser curvature just proximal to the antrum. Note the #18 Levin tube in position for gastric lavage Malignant cells will be recovered in the stomach wash if this should be a malignant ulcer Likewise the coarse rugal folds in the cardia may represent an infiltrating lymphoma or adenocarcinoma or merely hypertrophic gastritis Gastric cytology most often establishes the definitive diagnosis in instances of malignancy

Intubation

The patient sits on a cot, elevated 10 inches at one end A double lumen gastroduodenal radiopaque tube (Diamond tube) with a 3–5 gm weight at the tip is passed through the mouth to a position just below the cardioesophageal junction (45 cm) The patient is placed on his left side with head elevated and fed an additional 15 cm of tubing so that the tip of the tube will be lying just proximal to the antrum along the greater curvature The patient then sits up and bends forward taking a few deep breaths. The tip of the tube slips into the antrum as the anterior wall of the stomach falls away from the posterior wall Next the patient is placed on his right side (feet elevated) and 10 more cm of tubing is slowly introduced which should send the tube into the first part of the duodenum Finally the patient lies on his back for 2 minutes and swallows an additional 15 cm of tube A check of the tube s position fluoroscopically will reveal the tip of the tube between the second and third portions of the duodenum The complete intubation usually requires about 15 minutes.

Duodenal Drainage

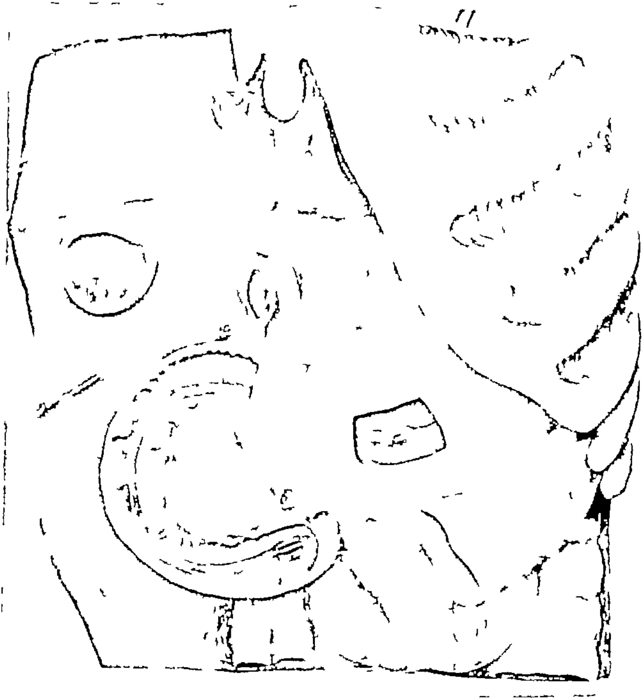
Tape the tube to the side of the patient s face Before the actual collection is started the stomach is aspirated to remove the residuum Connect the gastric and duodenal segments to a Gomco vacuum pump (120 mm Hg pressure) The gastric secretion is drained directly into a large collecting jar the duodenal aspirate is trapped in 30-cc plastic tubes immersed in an ice-water bath Secretin may be injected intravenously after a 20 minute control period has shown duodenal juice to be consistently alkaline to litmus paper and the gastric juice to be acid

Three 10-minute samples are collected and the gastric and duodenal secretions are checked frequently with litmus paper in order to insure independent collection

Record the volume of the 30 minute postsecretin pancreatic secretion and then centrifuge the fluid for 5 minutes Decant the supernatant which is saved for bicarbonate determination and smear the sediment on glass slides for cytologic study

DUODENAL CYTOLOGY RESULTS

TOTAL CASES	CLINICALLY BENIGN	CYTOLOGY NEGATIVE	CYTOLOGY FALSE POSITIVE	ACCURACY PERCENT NEGATIVE	CLINICALLY MALIGNANT	CYTOLOGY POSITIVE	CYTOLOGY FALSE NEGATIVE	ACCURACY PERCENT POSITIVE
204	159	158	1	99	45	30	15	66



Carcinomas of the head of the pancreas common bile duct and gall bladder are schematically represented A double lumen Diamond tube is placed in the duodenum to collect pancreatic secretions and bile The window in the stomach reveals the second lumen of the tube which drains the stomach

Patient Preparation

Successful colon cytologic washes can be achieved only if the colon is throughly cleansed prior to the examination Two ounces of a sodium phosphate cathartic by mouth the evening prior to the day of the test has been found satisfactory On the morning of the procedure elevate the foot of the bed on 12 inch blocks and administer saline enemas with the patient lying on his left side In this position most patients are able to retain from 2 500 to 3 500 cc of fluid per enema so that four or five enemas are sufficient completely to cleanse the colon The patient then lies on his back and then on his right side before expelling the enema The last enema must contain no particulate matter and should be absolutely clear Approximately an hour after the final enema the cytology test may be started It has been observed that delay of an hour insures better cell collection

Intubation

Introduce the proctoscope as far as possible and guide a 12 Fr Ewald tube a few centimeters beyond the end of the proctoscope Withdraw the proctoscope and introduce 1 000 cc of saline solution slowly through the Ewald tube Level the proctoscopic table and maneuver the patient to his right side After a few minutes rotate the patient to his back and massage the abdomen vigorously wait several minutes and collect the irrigating fluid

The colonic wash water is collected in a 1 000-cc beaker that is immersed in ice water From this beaker the fluid is poured through a strainer into 50-cc plastic centrifuge tubes and centrifuged for 2 minutes and then processed as previously described

The same procedure is then repeated using 800 cc of sodium acetate buffer (pH 5 3) instead of the saline solution

COLON CYTOLOGY RESULTS

TOTAL CASES	CLINICALLY BENIGN	CYTOLOGY NEGATIVE	CYTOLOGY FALSE POSITIVE	ACCURACY PERCENT NEGATIVE	CLINICALLY MALIGNANT	CYTOLOGY POSITIVE	CYTOLOGY FALSE NEGATIVE	ACCURACY PERCENT POSITIVE
135	98	97	1	99	37	35	2	95



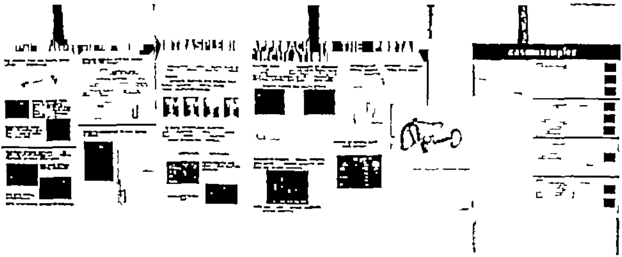
The above model demonstrates carcinoma of the cecum and splenic flexure of the colon A #12 Ewald tube has been inserted into the rectosigmoid through a proctoscope Irrigation of the entire colon can now be easily accomplished and exfoliated malignant cells recovered.

Honorable Mention

GASTROENTEROLOGY AND PROCTOLOGY

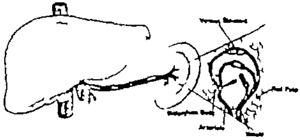
Intrasplenic Approach to the Portal Circulation. W D Davis Jr Stanley Reichman Richard Gorlin J P Storaasli and H M. Batson Jr Ochsner Clinic, Tulane University School of Medicine New Orleans and U S Naval Hospital Portsmouth Va

The exhibit portrays the technic of intrasplenic injection and the use of this technic in measurement of portal pressure the instantaneous estimation of hepatic blood flow by means of radioactive serum albumin and external counting technic, as well as in splenoportography—clinical applications in acute hepatitis cirrhosis and other conditions will be indicated as well as use as research tools.



portal pressures via the spleen

THE SPLENIC PULP AND PORTAL CIRCULATION ARE CONTINUOUS



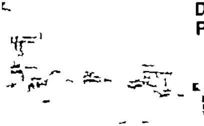


PORTAL VENOUS PRESSURE IS ACCURATELY REFLECTED BY SPLENIC SINUSOIDAL (PULP) PRESSURE–ACUTE CHANGES INDUCED BY DRUGS.

SIMULTANEOUS PRESSURES IN PORTAL VEIN AND SPLEEN IN ANESTHETIZED DOG



DOG WITH SPLENIC EXPLANT MAY BE USED TO STUDY PHYSIOLOGY OF PORTAL PRESSURE WITHOUT ANESTHESIA



DOG WITH NORMAL PORTAL PRESSURE



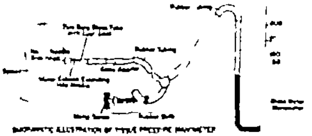
DOG WITH PORTAL HYPERTENSION

NOTE HYPOTENSIVE EFFECT OF PITUITRIN

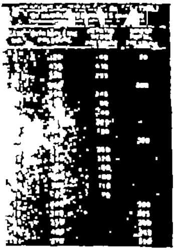
SIMILIAR OBSERVATIONS ARE EASILY MADE IN THE HUMAN

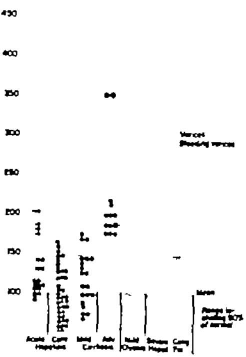
TECHNIQUE

1. PATIENT SUPINE.
2. LOCATE 9th LEFT INTERCOSTAL SPACE IN MID TO POST AXILLARY LINE—CHECK FOR PERCUSSION DULLNESS
3. SKIN ANESTHESIA—1% PROCAINE—2 INCH 25-26 GAUGE NEEDLE
4. INTRASPLENIC LOCATION VERIFIED BY PARADOXICAL RESPIRATORY MOTION OF NEEDLE AND ASPIRATION OF BLOOD.
5. PRESSURE RECORDED WITH NO 22 SPINAL NEEDLE AND ELECTROMANOMETER BURCH PHLEBOMANOMETER, OR SPINAL FLUID MANOMETER.



RESULTS-CORRECTED TO 4 CM RETRO-STERNAL

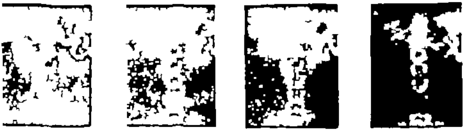




DETERMINATION OF HEPATIC BLOOD FLOW BY INTRASPLENIC INDICATOR DILUTION TECHNIQUE

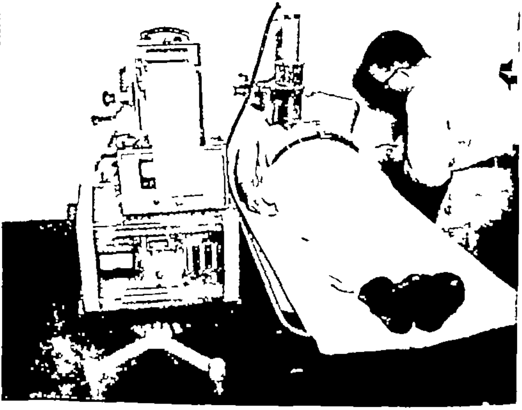
I. THEORY

A. MATERIAL INJECTED INTO SPLENIC PULP IS RAPIDLY CLEARED BY PORTAL BLOOD AS IN THESE SPLENOPORTOGRAMS



0 2 4 6
SECONDS

B. RAPID INTRASPLENIC INJECTION OF A BOLUS OF INDICATOR AND ANALYSIS OF CURVE OF DILUTION IS BASIS FOR CALCULATION OF FLOW (STEWART & HAMILTON FRIEDELL, ET AL)



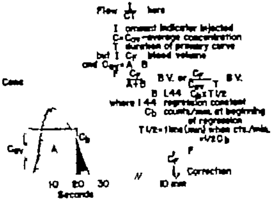
DETERMINATION OF HEPATIC BLOOD FLOW BY INTRASPLENIC INDICATOR DILUTION TECHNIQUE

DILUTION CURVE MAY BE INSCRIBED BY RECORDER OVER THE LIVER OR GOTTEN FROM RENAL HEPATIC VEIN CATHETER WHEN RADIOACTIVE I_{131} LABELED SERUM ALBUMIN IS USED PERIPHERAL ARTERIAL ARRIVAL MAY ALSO BE MONITORED

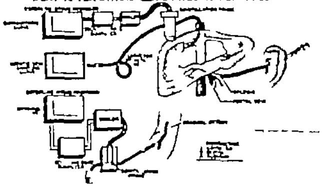
SAMPLE CURVES AND CALCULATIONS







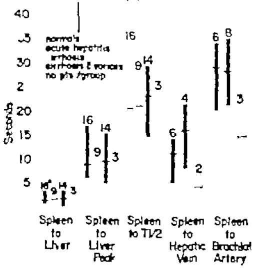
SCHEMATIC ILLUSTRATION OF HEPATIC BLOOD FLOW MEASUREMENT AFTER INTRASPLENIC INJECTION OF R I S A *



DETERMINATION OF DIFFERENTIAL SPLENO PORTAL CIRCULATION TIMES WITH RADIO-ACTIVE INDICATOR

Intervals from spleen to arrival at liver time of liver perfusion hepatic venous arrival (by catheter sample) and peripheral arrival may all be determined

SPLENOPORTAL CIRCULATION TIMES USING R I S A



DIFFERENTIAL SPLENOPORTAL CIRCULATION TIMES IN SECONDS USING R I S A

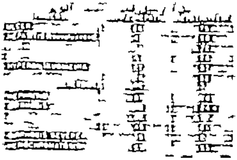
	Average	Range
Spleen to Liver	2.4	(1.5-4)
Spleen to Liver Peak Activity	9 5	(7 12)
Spleen to Hepatic Vein	13	(9-15 5)
Spleen to T 1/2 Descent Activity in Liver	20	(15 5-24)
Spleen to Brachial Artery	28	(24 33)

ACKNOWLEDGEMENTS

Aided by grant no H-2637 U S Public Health Service

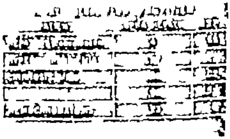
Electronic equipment kindly furnished by Spinco Division Beckman Instruments Inc Belmont California

COMPARISON OF TECHNIQUES

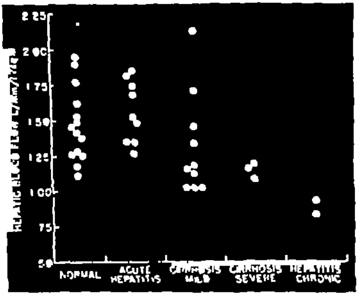


SUPRA HEPATIC AND HEPATIC VEIN DILUTION SAMPLING

SUPRA HEPATIC AND BSP



SUMMARY OF RESULTS IN NORMAL PATIENTS WITH ACUTE AND CHRONIC HEPATITIS AND MILD AND SEVERE CIRRHOSIS



NOTE LOW FLOWS IN SEVERE CIRRHOSIS AND CHRONIC HEPATITIS

CHANGE OF HEPATIC FLOW IN THE SAME PATIENT

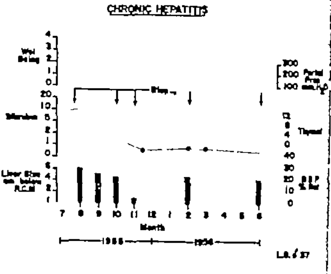
CHANGE IN HEPATIC BLOOD FLOW
L/MIN/1.73 m²

STIMULUS	BEFORE	AFTER	SPLENIC PRESSURE mm H_2O
PITUITRIN	1.2	[illegible]	↓175
	1.2	0.78	↓40
PERICARDIECTOMY	0.61	1.25	
FOOD	1.13	1.33	
EXERCISE	1.26	0.92	

case examples

CASE I

37-Male Moderately severe acute hepatitis of 2 wks duration Deep jaundice, large liver Lab. studies indicated severe parenchymal liver damage Biop (I) severe acute hepatitis c̄ extensive parenchymal disorg & inflamation Splenic pres initially 200 mm. H_2O increased to 250 mm. H_2O Clin manifestations improved but stromal collapse & mild fibrosis appeared by biop (2). Flow only .82 L/min/17 sq m at point of highest splenic pres

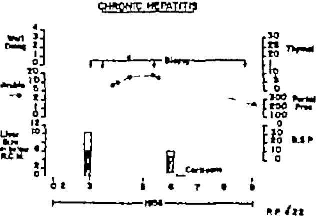


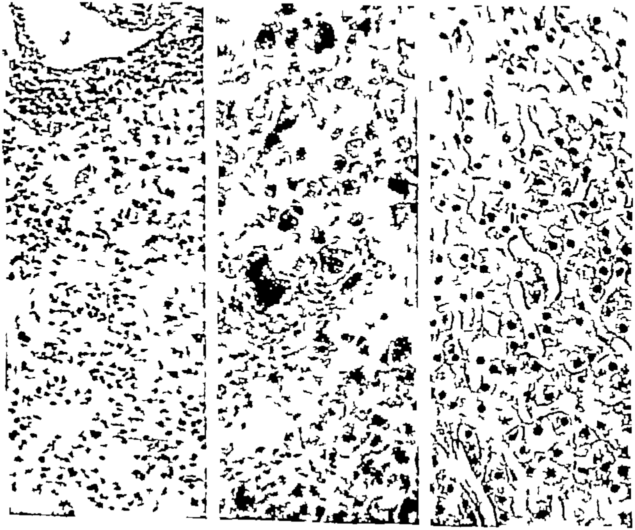




CASE 2

More sev necrotizing hepatitis than case I but c̄ rather indolent clinical course Liver & spleen extremely large & portal pres quite high (345 mm. H_2O) Portal flow normal (1 6 L/min/1 7 sq m.) Biop (1&2) revealed progressive necrosis c̄ stromal collapse Portal pres dropped slightly but hepatic flow decreased to 97 L/min/1 7 sq. m Following cortisone remarkable improv occur Portal pres returned to 200 mm. H_2O Biop showed extensive regeneration

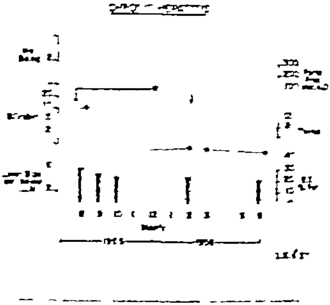




case examples

CASE I

57-Male-Moderately severe acute hepatitis of 2 wks. duration. Deep jaundice, large liver. Lab studies indicated severe parenchymal liver damage. Biop (1) severe acute hepatitis c extensive parenchymal disorg c inflammation. Splenic pres initially 200 mm H_2O increased to 250 mm H_2O. Clin. manifestations improved but stromal collapse c mild fibrosis appeared by biop (2). Flow only .82 L/min/1.7 sq m at point of highest splenic pres.

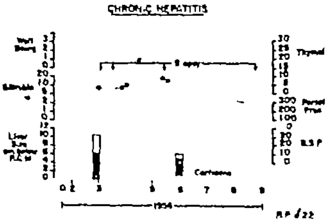


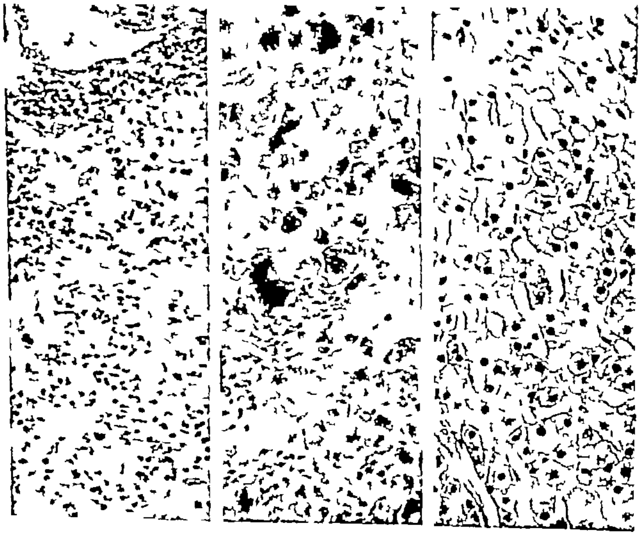




CASE 2

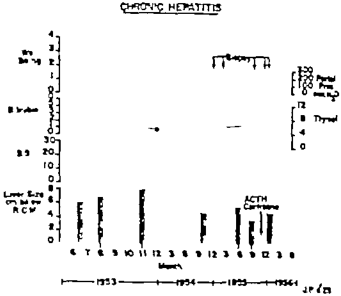
More sev necrotizing hepatitis than case I but c̄ rather indolent clinical course Liver & spleen extremely large & portal pres quite high (345 mm H_2O) Portal flow normal (1 6 L/min/1 7 sq m) Biop (1&2) revealed progressive necrosis c̄ stromal collapse Portal pres dropped slightly but hepatic flow decreased to 97 L/min/1 7 sq m Following cortisone remarkable improv occur Portal pres returned to 200 mm H_2O Biop showed extensive regeneration





CASE 3

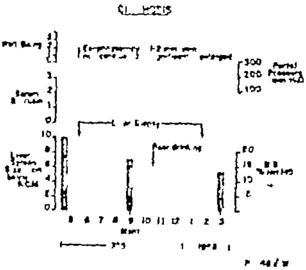
Established post hepatic cirrhosis Portal pressure normal until long after fibrosis became advanced (biopsy) Following course of ACTH and cortisone portal hypertension (310 mm H_2O) and esophageal varices occured.

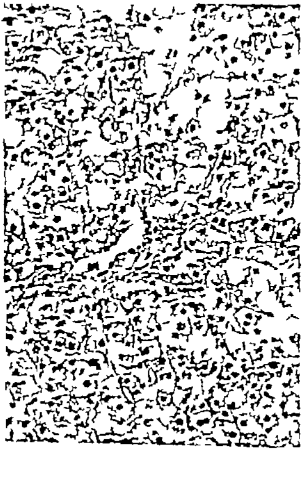


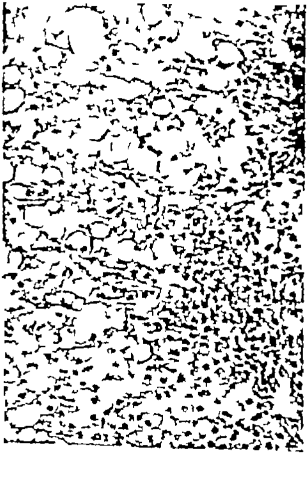


CASE 4

Alcoholic cirrhosis with fatty infiltration Biopsy (1) test and portal pressure (300 mm H_2O) all abnormal at first, but with hospitalization and treatment all returned to almost normal Biopsy (2)







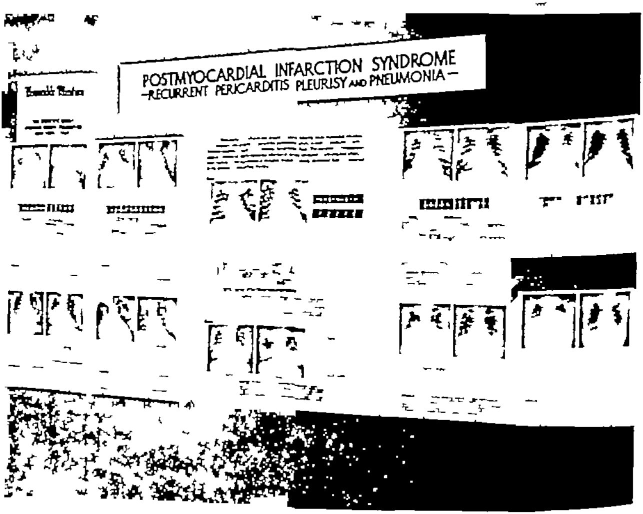
Honorable Mention

INTERNAL MEDICINE

The Postmyocardial Infarction Syndrome

William Dressler Maimonides Hospital State University of New York College of Medicine Brooklyn, N. Y

A complication of acute myocardial infarction was observed in 40 patients. It starts from one to eight weeks of the onset of the coronary attack and has tendency to relapse. The complication consists of pericarditis, pleurisy and pneumonitis. The clinical features are prolonged or recurrent fever and pain of the pleuro-pericardial type pericardial friction rub occurring late and of long duration; pericardial and pleural ffusions which may be intensely hemorrhagic in the absence of anticoagulant effect. The condition may last for several weeks or months but is sually benign. It is not affected by antibiotics. Cortisone promptly abolishes pain and fever nd shortens the course. The post-myocardial-infarction syndrome closely resembles non specific pericarditi and the post-commissurotomy syndrome. Its etiology seems to be sensitization to necrotic myocardium.



PERICARDITIS ASSOCIATED with RECENT MYOCARDIAL INFARCTION

PERICARDITIS may be an insignificant feature of acute myocardial infarction or it may represent a serious complication which over-shadows and outlasts the basis condition It is then often associated with pleurisy or pneumonitis, and the clinical picture resembles closely the Postcommissurotomy Syndrome and Idiopathic Pericarditis This complication is referred to as POSTMYOCARDIAL INFARCTION SYNDROME

DISTINGUISHING FEATURES of the TWO TYPES of PERICARDITIS which MAY ACCOMPANY ACUTE MYOCARDIAL INFARCTION

as a SIGN of acute myocardial infarction	as a COMPLICATION of myocardial infarction
The pericardial friction rub is usually heard between the 2nd and 4th day of illnes.	The pericardial friction rub is heard between the 2nd and 8th week of illness
The pericardial friction rub is evanescent	The pericardial friction rub lasts for several days or weeks
Pericardial effusion is extremely rare	Pericardial effusion is common
Pericarditis is not associated with pleurisy or pneumonitis	Pericarditis is often accompanied by pleurisy or pneumonitis
Pericarditis does not recur	Recurrences are a significant feature of the syndrome

CLINICAL and LABORATORY FEATURES of the POSTMYOCARDIAL INFARCTION SYNDROME

1 The initial period of fever which follows the acute coronary attack is prolonged lasting for more than a week or a new rise in temperature occurs

2 Pain is felt substernally in the precordium neck shoulders and arms, and is significantly aggravated by deep inspiration yawning cough ing or twisting the body

3 A pericardial friction rub is of prolonged duration or occurs late

4 Fever pain and pericardial friction rub have a tendency to recur

5 Pericardial effusion is revealed by serial x ray studies

6 Pleurisy and pneumonitis are often observed and occasionally dom inate the clinical picture

7 The exudates may be intensely hemorrhagic in the absence of anti coagulant effect

COURSE

The duration of the Postmyocardial Infarction Syndrome varies with the number of relapses It lasts from a few weeks to several months.

PROGNOSIS

The condition has proved benign thus far

DIAGNOSIS

A Postmyocardial Infarction Syndrome may be suspected when, fol lowing an acute myocardial infarction the initial febrile period is pro longed or fever recurs and the patient complains of pain of pleuro-per icardial character The diagnosis is confirmed by observation of a per icardial friction rub which is audible for several days or weeks and has a tendency to recur and by X-ray evidence of pericardial effusion On the other hand evidence of recurrent coronary attacks or pulmonary infarction is absent

Common diagnostic errors include extension of myocardial infarc tion pulmonary embolism and hemopericardium due to anticoagulant therapy

INCIDENCE

40 patients presenting this syndrome were observed in the past 3 years 30 of whom were routine admissions to the Maimonides Hos pital It is estimated that the complication occurs in 3 per cent of the cases of acute myocardial infarction

ETIOLOGY

The cause of the Postmyocardial Infarction Syndrome is unknown The condition has been observed in the absence of anticoagulant ther apy Bacterial agents were not found in cultures of blood pericardial and pleural aspiration fluids Antibiotics were ineffective

Allergy was shown to be a factor in the production of pericarditis pleurisy and pneumonitis a triad which is common to idiopathic peri carditis the Postcommissurotomy Syndrome and the Postmyocardial Infarction Syndrome It is possible that sensitization is caused by an autogenous antigen which is produced in the Postcommissurotomy Syn drome by the trquma of surgery in the Postmyocardial Infarction Syn drome by necrosis of the myocardium

-

THERAPY

Many patients need no therapy since as in idiopathic pericarditis and in the Postcommissurotomy Syndrome the attacks are self limited. Salicylates often have a beneficial effect When the complication is un duly prolonged and pain is severe adrenal steroids may be used This promptly terminates fever and pain and shortens the course Meticor ten may be given over a period of from 4 to 6 weeks beginning with daily doses of 35 mg and gradually reducing the doses Rebounds may occur when the steroids are discontinued

Anticoagulant therapy may be harmful It is therefore important to distinguish between extension of myocardial infarction pulmonary em- bolism and the Postmyocardial Infarction Syndrome

Case History



Fig A. [illegible] December 27 [illegible] days after the primary attack. The cardiac silhouette [illegible] not appreciably enlarged

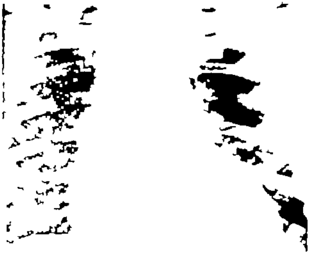


Fig B. [illegible] January [illegible] day of illness). The size of the cardiac silhouette has conspicuously increased.

P G a 62 year old diabetic man, suffered a major coronary attack on November 20 1955 An ECG (Fig 6C) taken on the next day, revealed anteroseptal wall myocardial infarction

The temperature (Fig 6D) rose at the end of the first day, reached its first peak of 101 8° on the 2nd day of illness and another peak of 103° on the 8th day Chest pain severe enough to require morphine was felt during the first 5 days The temperature returned to normal on the 14th day Prolonged pain and fever were thought to be due to extension of myocardial infarction, but serial ECGs failed to support this view

The patient was discharged on the 30th day of illness He was readmitted on the following day because of a new attack of substernal pain which was aggravated by breathing, yawning and turning in bed The temperature rose to 103 6° and fell to 100° on the 36th day X-ray study of the chest (Fig 6A) on the 40th day failed to support a diagnosis of pericardial effusion. The patient was discharged on the 42nd day

On the 49th day the temperature rose to 102 2° and remained elevated for 6 days Occasionally the patient felt a sharp stabbing pain in the lower half of the chest which lasted for a few minutes X ray study (Fig 6B) revealed conspicuous enlargement of the heart silhouette, raising again suspicion of pericardial effusion. In the 9th week of illness the temperature rose to 102° and remained elevated for 3 weeks Antibiotics were used without effect The venous pressure was normal

In the 10th week for the first time a pericardial friction rub was heard and remained audible for 8 days Pericardial paracentesis was performed in the 11th week It produced a straw colored fluid which rapidly coagulated and had a protein content of 4 7 per cent Cultures of the exudate and blood remained steril

Meticorten was given on the 79th and 80th days at a daily dosage of 30 mg It caused promptly a fall in temperature When meticorten was withdrawn the temperature rose again to 103 8 Therefore administration of meticorten was resumed on the 84th day Rapid improvement followed Chest pain subsided and the temperature fell to normal The patient was discharged on the 87th day Administration of meticorten in diminishing dosage was continued for 6 weeks The patient remained well after it was discontinued

Anticoagulant therapy was used during the first 3 weeks of illness The prothrombin time never exceeded therapeutic levels

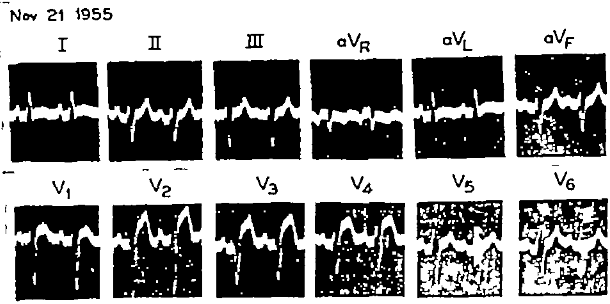
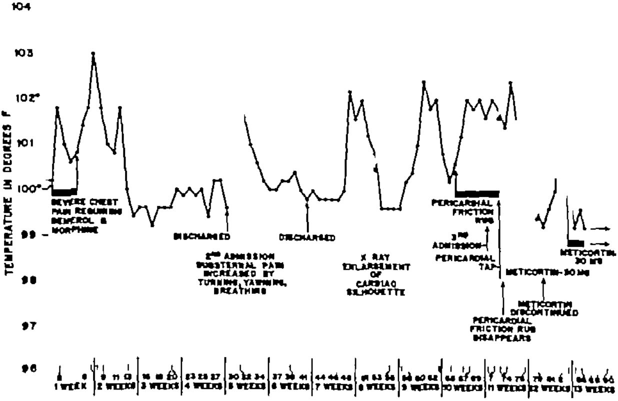


Fig 6 C



Acute myocardial infarction was followed by a prolonged initial period of fever and chest pain. Fever and pain of the pleuro-pericardial type recurred in the 5th 7th and 9th week of illness In the 8th week pericardial effusion was suggested by enlargement of the cardiac silhouette A pericardial friction rub was first heard in the 10th week Pericardial paracentesis produced a straw colored fluid with the characteristics of an exudate Fever and chest pain were terminated by the use of meticorten.

Case History

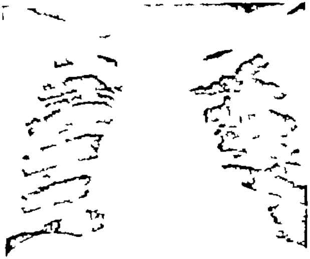


Fig 6 [illegible] G. December 27 [illegible] days after the coronary [illegible] The cardiac silhouette [illegible] not appreciably enlarged

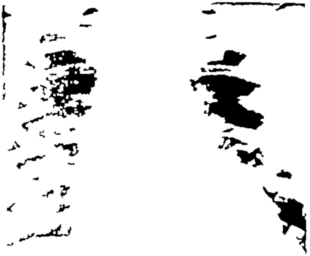


Fig. [illegible] (6 foot film) P G. January [illegible] (... day of illness) The size of the cardiac silhouette has conspicuously increased.

P G a 62 year old diabetic man, suffered a major coronary attack on November 20 1955 An ECG (Fig 6C) taken on the next day, revealed anteroseptal wall myocardial infarction

The temperature (Fig 6D) rose at the end of the first day, reached its first peak of 101 8° on the 2nd day of illness, and another peak of 103° on the 6th day Chest pain severe enough to require morphine was felt during the first 5 days The temperature returned to normal on the 14th day Prolonged pain and fever were thought to be due to extension of myocardial infarction, but serial ECGs failed to support this view

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Case History



Fig. A. [illegible]



Fig. B. [illegible]



Fig. C.

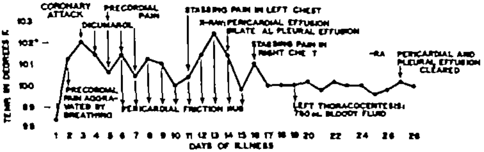


Fig. 4 D.

[illegible]

[illegible]

Summary Acute myocardial infarction was followed by fever of 2 weeks' duration. A pericardial friction rub was audible from the 6th to 15th day of illness Roentgenologic examination supported the clinical diagnosis of pericarditis and bilateral pleurisy Thoracocentesis yielded intensely bloody fluid There was no evidence of pulmonary infarction. Anticoagulant therapy was used for 6 days the prothrombin time never exceed ing therapeutic values

Case History



Fig. 10 A. [illegible] E.M. March [illegible] [illegible] days after the coronary attack). The cardiac silhouette is moderately enlarged.



Fig. 10 B. [illegible] E.M. March [illegible] [illegible] weeks after Fig. 10 A). The size of the heart shadow has considerably decreased.



Fig. 10 C.

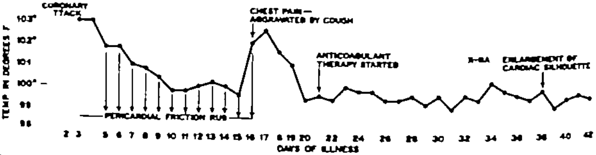


Fig. 10 D.

E.M., 47 year old man, suffered an attack of [illegible] pressure across the chest on February [illegible]. An ECG (Fig. 10C) taken [illegible] days later showed signs of antero-septal wall myocardial infarction.

The temperature (Fig. 10D) rose on the 3rd day to [illegible] and returned to normal on the [illegible] day of illness. [illegible] pericardial friction rub was heard during the first [illegible] weeks. On the 16th day the temperature rose again to [illegible] and remained elevated for [illegible] days. Simultaneously the patient complained of chest pain aggravated by cough. Virus infection, myocardial or pulmonary infarction were suspected as possible causes.

After the [illegible] day of illness the temperature was mostly below [illegible]. The patient seemed to make satisfactory progress except for [illegible] [illegible] which was constantly present. On the 38th day [illegible] indicated increase of the cardiac dullness, but pericardial effusion was not suspected. X-ray study (Fig. 10A on the [illegible] day [illegible]) showed enlargement of the cardiac silhouette. Follow-up study [illegible] weeks later (Fig. 10B) showed striking diminution in the size of the cardiac silhouette, consistent with absorption of pericardial effusion. The patient improved and was discharged on the [illegible] day of illness.

Anticoagulant therapy was withheld initially because [illegible] history [illegible] ulcer was obtained. [illegible] was not until [illegible] weeks after the coronary attack, when recurrent myocardial infarction or pulmonary infarction was suspected, that administration of dicumarol was started. The ECG, however, did not reveal additional myocardial damage nor was there effusion, or roentgenologic evidence of pulmonary infarction.

Summary Following acute myocardial infarction a pericardial friction rub was heard for 2 weeks A second bout of fever occurred on the 16th day associated with chest pain which was aggravated by cough On the 38th day x-ray study indicated enlargement of the heart which was no longer present 2 weeks later The illness lasted for 8 weeks

Case History·



Fig. 12 (Bedside study). M.M., February 15, [illegible] [illegible]

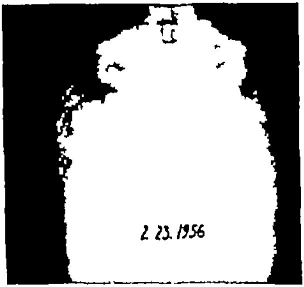


Fig. 12 B. (Bedside study) M.M., February 23, [illegible] [illegible]

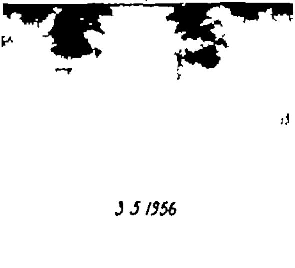
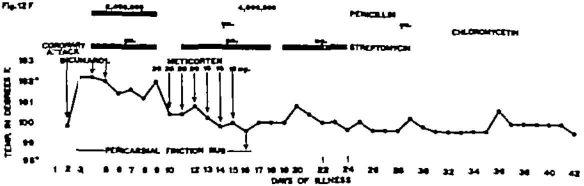


Fig. 12 C. (Bedside study) M.M., March [illegible] [illegible]



Fig. 12 D. [illegible] M.M., March [illegible] [illegible]





Acute myocardial infarction was complicated by pericarditis, pneumonitis and pleurisy Hemorrhagic pneumonia was the dominant complication It developed on the 3rd day and spread rapidly involving both lungs No responsible bacterial agent was discovered Antibiotics were of no avail Administration of meticorten was followed by improvement The complication lasted for about 6 weeks

Case History



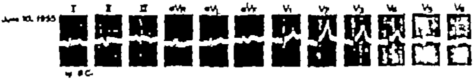


Acute myocardial infarction was followed by a febrile period which lasted for 2 weeks A pericardial friction rub was audible from the 3rd to 23rd day of illness On the 16th day the temperature rose again and x ray study suggested pericardial effusion Adrenal steroid therapy caused rapid improvement One month after discontinuing this therapy a relapse occurred which was quickly controlled by a short course of steroid medication

Case History







Summary Following acute myocardial infarction which did not appear to be *extensive* *chest pain of the pleuro-pericardial type developed on the* 3rd day and recurred repeatedly in the following 8 weeks In the 5th week of illness x-ray study indicated pericardial and pleural effusions The complication was promptly terminated by cortisone The course of the basic illness was prolonged by more than 8 weeks

[illegible]

Acute myocardial infarction was complicated by pericarditis pneumonitis and pleurisy Hemorrhagic pneumonia was the dominant com plication It developed on the 3rd day and spread rapidly involving both lungs No responsible bacterial agent was discovered Antibiotics were of no avail Administration of meticorten was followed by improvement The complication lasted for about 6 weeks

Case History



[illegible]



[illegible]

[illegible]

Acute myocardial infarction was followed by a febrile period which lasted for 2 weeks A pericardial friction rub was audible from the 3rd to 23rd day of illness On the 16th day the temperature rose again and x ray study suggested pericardial effusion Adrenal steroid therapy caused rapid improvement One month after discontinuing this therapy a relapse occurred which was quickly controlled by a short course of steroid medication

PATENT DUCTUS ARTERIOSUS

AL

CONGENITAL ACYANOTIC
(UNCOMPLICATED)
2 TO 1 INCIDENCE IN FEMALES
USUALLY A SINGLE DEFECT



YM TOM :

NO EARLY SYMPTOMS WITH AVERAGE SHUNT
MAY BE UNDERDEVELOPED
DYSPNEA — FATIGUE — FAILURE (LATE)

THRILL OVER 2ND INTERCOSTAL SPACE
LEFT OF STERNUM
WIDENED PULSE PRESSURE IN SOME



MU MU :

SYSTOLIC AND DIASTOLIC
CONTINUOUS MURMUR
2ND INTERSPACE LEFT OF STERNUM
MACHINERY MURMUR

AY:

PROMINENT PULMONARY
ARTERY SEGMENT
PULMONARY VASCULAR
MARKINGS INCREASED

NORMAL AXIS
LATE— LEFT AXIS DEVIATION

MEAN AGE OF DEATH 29 YEARS
DEATH DUE TO FAILURE —(SBE)

Y:

ALL CASES SHOULD BE OPERATED
OPTIMUM AGE 4 TO 12 YEARS
MORTALITY LESS THAN 1 %
RESULTS — COMPLETE CORRECTION



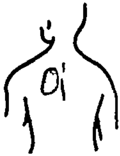


COARCTATION OF THE AORTA

o

CONGENITAL ACYANOTIC
INCIDENCE 3 TO 1 IN MALES
PRIMARY AND ASSOCIATED





YM TOM

NO EARLY SYMPTOMS IN AVERAGE CASE
LATER WEAKNESS IN LEGS AND
HEADACHES AND VERTIGO

o

HYPERTENSION IN ARMS
HYPOTENSION IN LEGS
DIMINISHED OR ABSENT PULSATION
IN LEGS
PROMINENT PULSATION IN INTERSCAPULAR
AREA



M M

SYSTOLIC MURMUR OVER AREA OF
CONSTRICTION
BRUIT OVER INTERSCAPULAR AREA

Y

DECREASE IN SIZE OR ABSENCE OF
AORTIC KNOB
LATER NOTCHING OF RIBS
LEFT VENTRICULAR ENLARGEMENT

LEFT AXIS DEVIATION ON ELECTROCARDIOGRAM

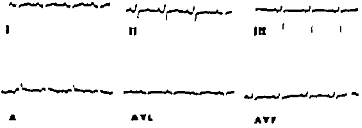
N O

AVERAGE AGE OF DEATH — 32 YEARS
CAUSE OF DEATH — FAILURE —
RUPTURE OF AORTA
CEREBRAL VASCULAR ACCIDENT

O Y

ALL CASES SHOULD BE OPERATED
OPTIMUM AGE 7 TO 12 YEARS
MORTALITY LESS THAN 5%
RESULTS — COMPLETE CORRECTION

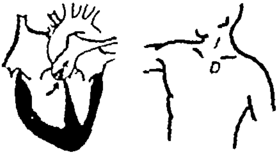




PULMONARY STENOSIS

CONGENITAL — ACYANOTIC
VALVULAR AND INFUNDIBULAR

ASYMPTOMATIC EARLY AND IN MILD CASES
RETARDED PHYSICAL DEVELOPMENT
DYSPNEA



SYSTOLIC THRILL OVER PULMONIC VALVE AREA

LOUD SYSTOLIC MURMUR AT 3RD INTERSPACE TO RIGHT OF STERNUM
NO VALVE SOUNDS



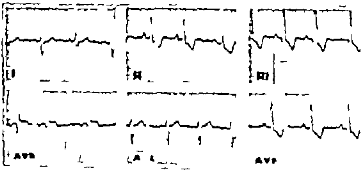
RIGHT VENTRICLE ENLARGED
MOST HAVE PROMINENT PULMONARY ARTERY SEGMENT
DECREASED PULMONARY VASCULAR MARKINGS

RIGHT AXIS DEVIATION AND RIGHT VENTRICULAR HYPERTROPHY

AVERAGE AGE OF DEATH — 32 YEARS
CAUSE OF DEATH — HEART FAILURE

OPERATE WHEN PROGRESSIVE SYMPTOMS DEVELOP
RESULTS — VALVULAR — EXCELLENT
INFUNDIBULAR — GOOD
MORTALITY — VALVULAR LESS THAN 1%
INFUNDIBULAR LESS THAN 5%





TETRALOGY OF FALLOT

AL:

CONGENITAL — CYANOTIC
PULMONIC STENOSIS — INTERVENTRICULAR SEPTAL DEFECT — OVER-RIDING OF AORTA — RIGHT VENTRICULAR HYPERTROPHY
(RIGHT TO LEFT SHUNT)



YMPTOM

VERY LIMITED EXERCISE TOLERANCE
FAINTING

GN

CYANOSIS INCREASED WITH EXERCISE
ASSUME SQUATTING POSITION
CLUBBING OF FINGERS AND TOES
INCREASED RBC, HEMOGLOBIN AND HEMATOCRIT



SYSTOLIC MURMUR AT PULMONIC AREA
(ABSENT 25 % CASES)

X- AY

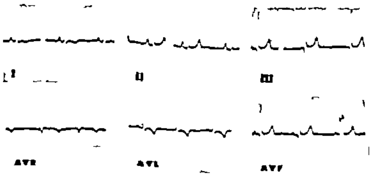
DECREASED PULMONARY VASCULAR MARKINGS
BOOT-SHAPED HEART — RIGHT VENTRICULAR ENLARGEMENT

RIGHT AXIS DEVIATION

AVERAGE AGE OF DEATH — 12 YEARS
CAUSES- HEART FAILURE — THROMBOSIS PNEUMONIA

SURGERY ESSENTIAL
BEST AGE 4 TO 8 YEARS
SHUNT OPERATIONS — BLALOCK AND POTTS
DIRECT RELIEF OF STENOSIS
8 TO 10 % MORTALITY

OPEN HEART SURGERY THE ULTIMATE APPROACH OF CHOICE
PRESENT OPERATIVE RISK HIGH





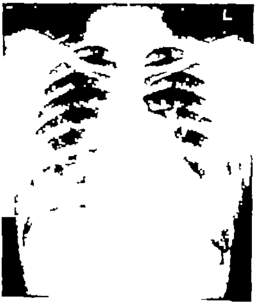
SEPTAL DEFECTS

CONGENITAL — ACYANOTIC
PRIMARY OR ASSOCIATED
INCIDENCE — ATRIAL 4 TO 1 FEMALES
VENTRICULAR EQUAL



DYSPNEA
CYANOSIS IN LATE STAGES

SYSTOLIC MURMUR
VENTRICULAR — ABOVE XYPHOID
ATRIAL — 3RD LEFT INTERSPACE



RIGHT HEART AND PULMONARY ARTERY
ENLARGEMENT
INCREASED PULMONARY VASCULAR
MARKINGS

RIGHT AXIS DEVIATION AND STRAIN
FREQUENTLY INCOMPLETE RIGHT
BUNDLE BRANCH BLOCK

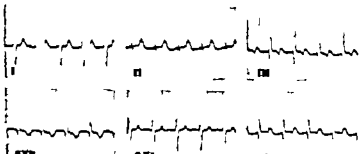
SMALL DEFECT — GOOD PROGNOSIS
LARGE DEFECTS — POOR
AVERAGE AGE OF DEATH
ATRIAL — 30 YEARS
VENTRICULAR — 14.5 YEARS

OPERATED WITH PROGRESSIVE SYMPTOMS
MOST ATRIAL DEFECTS — CLOSED TECHNIQUES
RESULTS EARLY CASES GOOD

VENTRICULAR — OPEN HEART TECHNIQUES
OPERATIVE RISKS GREATER— IMPROVING

BOTH MUST BE OPERATED BEFORE
STATE OF CONGESTIVE FAILURE





MITRAL STENOSIS

ACQUIRED RHEUMATIC LESION
INCIDENCE 3 TO 1 IN FEMALES

DECREASED EXERCISE TOLERANCE
DYSPNEA
FATIGUE
ORTHOPNEA



PULMONARY AND/OR PERIPHERAL EDEMA
HEMOPTYSIS
DIASTOLIC THRILL AT APEX

LOUD MITRAL FIRST SOUND
DIASTOLIC RUMBLE
PRESYSTOLIC ACCENTUATION
PULMONIC SECOND SOUND INCREASED



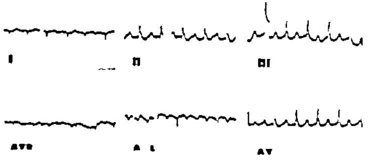
ENLARGED LEFT ATRIUM, PULMONARY ARTERY AND RIGHT VENTRICLE
NORMAL LEFT VENTRICLE
STRAIGHT LEFT BORDER

RIGHT AXIS DEVIATION AND HYPERTROPHY
ATRIAL FIBRILLATION — USUALLY IN LATE CASES

WHEN SYMPTOMS PROGRESSIVE — PROGNOSIS POOR
DEATH IN 3 YEARS AFTER ONSET OF HEMOPTYSIS
DEATH IN 4 YEARS AFTER ONSET OF CONGESTIVE FAILURE



ASYMPTOMATIC — NOT OPERATED
BEST RESULTS BEFORE FAILURE
MORTALITY LESS THAN 2 %
OVERALL MORTALITY 6 %
OVERALL RESULTS 75 % PTS. IMPROVED



MITRAL INSUFFICIENCY

• N AL
ACQUIRED RHEUMATIC LESION
INCIDENCE 4 TO 1 IN FEMALES

YM TOM I
FATIGUE — DYSPNEA
DECREASED EXERCISE TOLERANCE

• :
POUNDING CHEST WALL IN SEVERE CASES

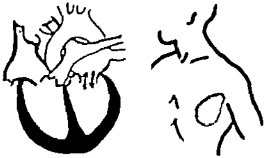
M M :
MITRAL SYSTOLIC MURMUR
PULMONIC SECOND SOUND INCREASED

- Y:
PULMONARY CONGESTION
INCREASED SIZE OF LEFT ATRIUM AND PULMONARY ARTERY
ENLARGED LEFT VENTRICLE

C • :
LEFT OR COMBINED VENTRICULAR HYPERTROPHY
ATRIAL FIBRILLATION IN MOST CASES

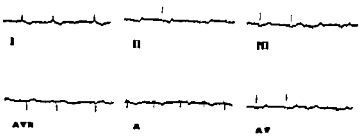
O• O I I
MORE SERIOUS THAN STENOSIS AND VERY POOR FOLLOWING LEFT VENTRICULAR FAILURE
DEATH AT AN EARLIER AGE THAN STENOSIS

R• Y:
MITRAL PURSE-STRING OPERATION
(RECENT — 50 CASES)
SALVAGE WITH IMPROVEMENT
43 % — ALL LATE CASES









AORTIC STENOSIS



● N RAL

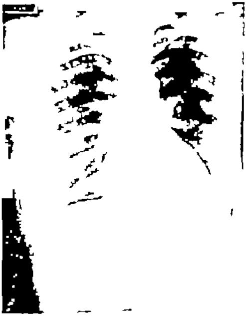
ACQUIRED RHEUMATIC LESION
(OCCASSIONALLY CONGENITAL)
INCIDENCE 3 TO 1 IN MALES

YMPTOM

HEART CONSCIOUSNESS
DIZZINESS — FAINTING
ANGINA — FAILURE

●N

SMALL PULSE PRESSURE
THRILL AT BASE AND INTO NECK



MU MU

HARSH SYSTOLIC MURMUR
3RD INTERSPACE RIGHT OF STERNUM
TRANSMITTED TO NECK VESSELS

– AY

ENLARGED LEFT VENTRICLE
NORMAL PULMONARY ARTERY AND
LEFT ATRIUM

O

LEFT VENTRICULAR HYPERTROPHY
AND STRAIN
NORMAL SINUS RHYTHM

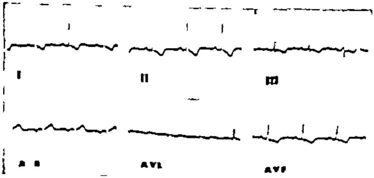
● NO

DEATH 1 TO 2 YEARS AFTER HEART
FAILURE

● Y

FAVORABLE SURGICAL RESULTS
BEFORE LEFT HEART FAILURE
FAIR TO POOR RESULTS AFTER
FAILURE
MORTALITY 6 % TO 11 %





AORTIC INSUFFICIENCY



ACQUIRED RHEUMATIC LESION
INCIDENCE 3 TO 1 IN MALES

HEART CONSCIOUSNESS
POUNDING HEART AND HEAD
DYSPNEA— FATIGUE — ANGINA

WIDE PULSE PRESSURE
WATER HAMMER PULSE

BLOWING DIASTOLIC OVER AORTIC AREA AND TO LEFT OF STERNUM
SOMETIMES SYSTOLIC PRESENT ALSO

X-RAY
ENLARGED LEFT VENTRICLE

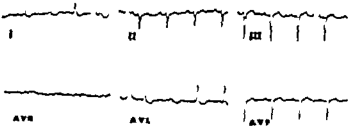
LEFT AXIS DEVIATION AND STRAIN
NORMAL SINUS RHYTHM

PROGRESSIVE AORTIC INSUFFICIENCY
MORE SERIOUS THAN AORTIC STENOSIS
OFTEN SUDDEN COLLAPSE AFTER LEFT VENTRICULAR FAILURE — DEATH
DEATH DUE TO HEART FAILURE

ARTIFICIAL VALVE : HUFNAGEL
70 % RELIEF OF HEART LOAD
MORTALITY 15 %







CORONARY INSUFFICIENCY



L

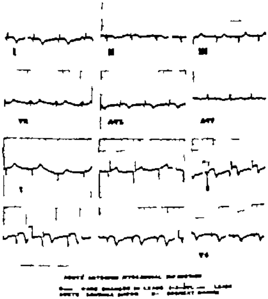
ARTERIOSCLEROTIC
HYPERTENSIVE
HEMODYNAMIC
INCIDENCE 4 TO 1 IN MALES

YMPT M

ACUTE — PAIN, SHOCK, COLLAPSE
— DEATH
CHRONIC — ANGINA, MILD TO SEVERE
PAIN— SUBSTERNAL, RADIATION TO
NECK, LEFT ARM, BACK

— AY

NOT OF VALUE EXCEPT WHEN
ASSOCIATED WITH FAILURE
OR HYPERTROPHY



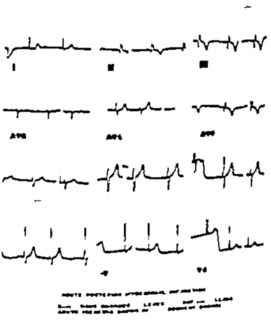
MILD CASES — NORMAL
CHANGES DURING AND AFTER ATTACKS
Q AND T WAVE CHANGES
S–T SEGMENT CHANGES

O

19 % ACUTE — DEAD WITHIN ONE MONTH
73 % DEAD IN TEN YEARS
WITH ANGINA — 89 % DEAD IN 10 YEARS
(D. WHITE, M. D.)

Y

BECK I OPERATION — STABILIZED CASES
90 % REHABILITATED— MORTALITY LESS
THAN 5 %
THOMPSON OPERATION — SIMPLE TALC
POUDRAGE
70 %–85 % GOOD RESULTS
BILATERAL INTERNAL MAMMARY ARTERY
LIGATION
NEW — LOWER RISK — 68 % IMPROVED
(NON–SELECTED CASES)
SHORT OBSERVATION TIME



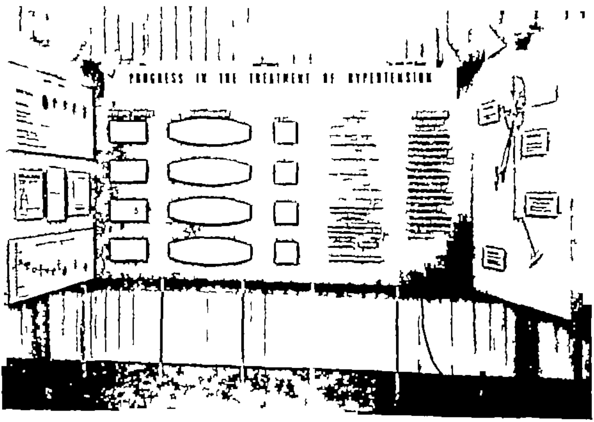


Certificate of Merit

Methods of Therapy in the Treatment of Essential Hypertension.

Garfield G Duncan, Jerome Waldron, William K. Jenson, Robert J Gill Richard J Eberly and Kenneth R. Knox, Pennsylvania Hospital Philadelphia

The exhibit summarizes the progress in the medical management of hypertension made possible through the judicious use of the newer hypotensive preparations. Clinical material consists of patients treated at the hypertension clinic of the Pennsylvania Hospital. Charts, graphs and diagrams illustrate methods of assessing the severity of the hypertensive process in individual patients and the correlation between severity and the medical regimen required to control it. Data are presented on the use of conservative measures such as sedatives and salt restriction, and on hypotensive drugs such as rauwolfia alkaloids, protoveratrine, phenoxybenzamine and pentolinium used singly and in combination. Much of the material is placebo controlled and results are based in some cases on continuous records for periods of two or more years.



There is no reliable method by which the clinician can judge whether a patient with mild hypertension today will have mild, moderate, or severe hypertension a year from now. Similarly, he has no sure way of knowing which of his hypertensive patients will develop apoplexy, cardiac or renal failure, coronary occlusion, or hypertensive crises. Consequently, every patient known to have essential hypertension should be treated, even if the condition appears to be mild and static when it is first discovered.

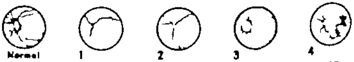
In recent years there has been remarkable progress in the medical management of essential hypertension. Even in malignant hypertension, if the patient is not in advanced renal failure, the fatal prognosis can often be changed by adequate therapy.

On the other hand, the drastic measures that are needed for the control of malignant hypertension are pointless when the disease is static or only moderately severe. The problem, then, is to evaluate the severity of the disease process in the individual patient and to choose the least noxious regimen that will provide adequate control.

The *severity index* described below has proved a valuable guide for evaluating the severity of the hypertension, for selecting the appropriate therapy, and for measuring the response of the patient to the prescribed regimen.

The severity of hypertension can be classified by assigning arbitrary numerical grades to the patient's condition as judged by six criteria.

SEVERITY INDEX



Arbitrary Number [illegible] Severity of Findings	0	1	2	3	4
CLINICAL CRITERIA					
Fundi Grade	Normal	1	2	3	4
Cardiac Enlargement	None	None	None	10-20%	20%
Diastolic Blood Pressure	Normal	96 110	111 125	126 1 0	140
PS 20-Minute Excretion	Normal [illegible]	40%	30%	20%	10%
	Normal	Norm	[illegible]	25 39	40
Response of Diastolic Pressure to Sodium Amytal Test or Bed Rest or Conservative Therapy	— — —	L bil	Moderately Labile	Moderately Fixed	F d

Score 0 if there [illegible] no cardiac [illegible] enlargement or normal B U

The sum of the arbitrary numerical grades is the severity index.

SEVERITY INDEX
ILLUSTRATIVE CASE

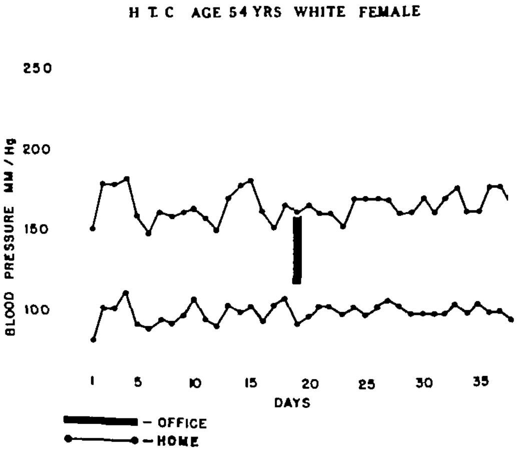
(Patient L.S.)

TESTS	RESULTS	NUMERICAL CONNOTATION
Fundi Grade	III	3
Percent of Cardiac Enlargement	8%	2
Diastolic Pressure	130	3
P.S P (20 minutes)	18%	3
B U N	14	0
Response of Diastolic Pressure to Sodium Amytal Test or Bed Rest or Conservative Therapy	Moderate Fixed	3
		14
		SEVERITY INDEX

Using the severity index, the hypertensive process in a given patient is graded as follows:

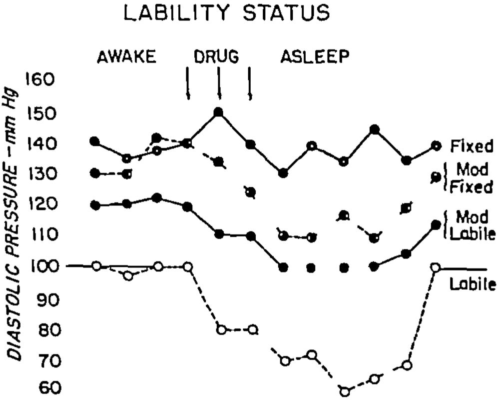
Severity Index	Classification
0 5	Mild hypertension, Grade I
6 10	Moderately severe labile hypertension, Grade II
11 15	Severe static hypertension, Grade III
16 20	Severe progressive malignant hypertension Grade IV

Home blood pressure readings are of utmost importance especially for patients taking a ganglionic blocking agent Patients who show severe elevation of blood pressure in the physician s office may in their own homes be only slightly hypertensive or have satisfactory control of their hypertension. The real value of home readings lies in the warning they give to the physician not to increase the ganglionic blocking agent He might easily do this on the basis of a high reading obtained in his office



Comparison of Home Blood Pressure Readings with Office Readings

The sodium amytal test is used to determine whether severe hypertension is labile or static. Three 200 mg. doses of sodium amytal are given at 1 hour intervals and the blood pressure is checked.

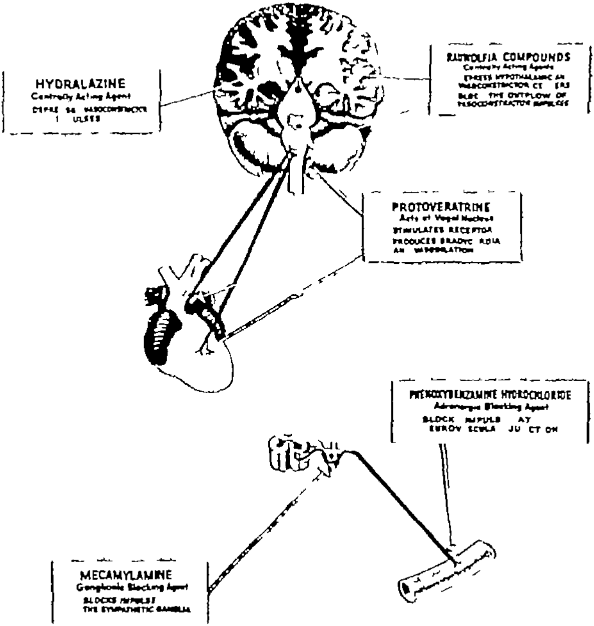


Four Examples of Response of Diastolic Blood Pressure to Sodium Amytal Test

If the diastolic pressure is reduced to 100 mm. of Hg or lower during this test the hypertension is considered as labile.

Severity Index	Classification	Incidence	Treatment
0-5	Mild labile Grade I	19%	● Correct obesity ● Restrict sodium intake ● Decrease tempo of living Increase physical rest ● Phenobarbital 16 to 32 mg (¼ to ½ gr) q i.d or Rauwolfia crude root 100 200 mg / day or Alkaloid up to 0 25mg / day
6-10	Moderately severe but labile Grade II	57%	● Correct obesity ● Restrict sodium intake ● Decrease tempo of living Increase physical rest ● Phenobarbital 16 to 32 mg (¼ to ½ gr) q i d or Rauwolfia crude root 100 200 mg / day or Alkaloid up to 0 25 mg / day ● Sodium intake 200 mg / day ● Rauwolfia alkaloid 1 mg and alkavervir fraction of Veratrum viride ① Combination Therapy ● Rauwolfia (crude root) 25 mg Phenoxybenzamine HCl 5mg Protoveratrine 0 2mg } ②
11 15	Severe static Grade III	17%	Combination Therapy ● Rauwolfia crude root 25mg Phenoxybenzamine HCl 5mg Protoveratrine 0 2mg } ② ● Mecamylamine + Rauwolfia ③ ● *Sympathectomy in selected cases*
16-20	Severe progressive and malignant Grade IV	7%	● Mecamylamine + Rauwolfia ③ ● *Sympathectomy in selected cases.*

① Rauwolfia Veriloid
② Mio Pressin
③ Inversine

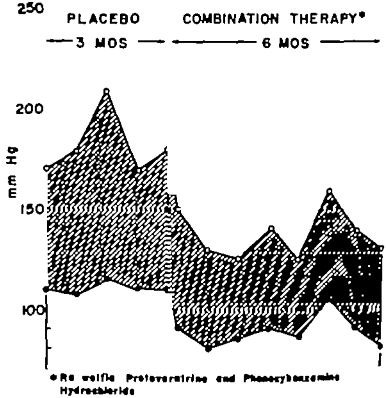

HYDRALAZINE
Centrally Acting Agent
RAUWOLFIA COMPOUNDS
PROTOVERATRINE
Acts at Vagal Nucleus
STIMULATES RECEPTOR
PHENOXYBENZAMINE HYDROCHLORIDE
Adrenergic Blocking Agent
MECAMYLAMINE
Ganglionic Blocking Agent

COMBINATION TREATMENT

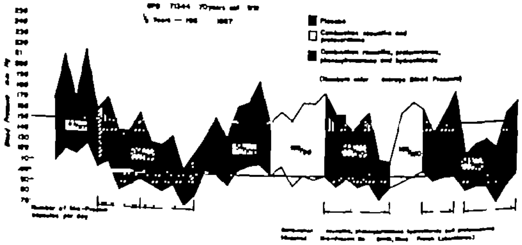
In moderately severe hypertension a combination of drugs each of which exerts its hypotensive effect in a different way is usually needed

The combination we have used most effectively at our clinic is that of rauwolfia phenoxybenzamine hydrochloride and protoveratrine (Mio-Pressin S K F)

Response to Combination Therapy



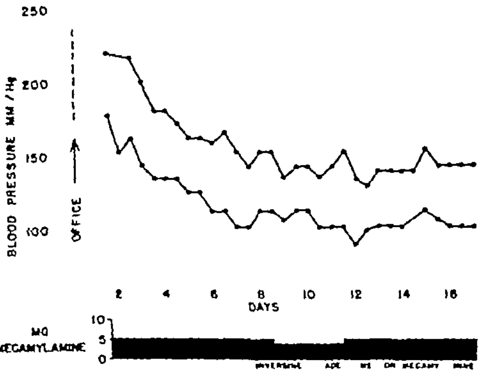
COMPARISON OF BLOOD PRESSURE RESPONSE TO DIFFERENT COMBINATION THERAPIES



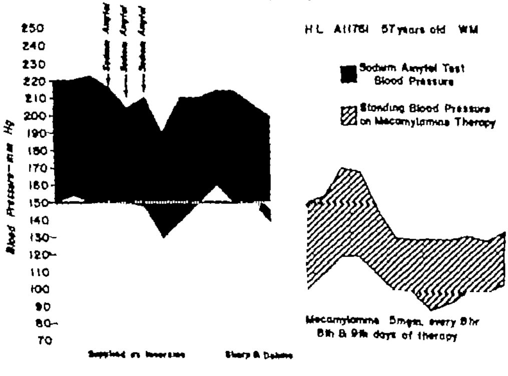
MECAMYLAMINE

Mecamylamine is a potent hypotensive drug, useful in the control of severe cases of hypotension which have not responded to more conservative measures and in the management of hypertensive crises. As a ganglionic blocking agent it is particularly useful in controlling severe static hypertension.

PT H. L. (A11761) AGE 57 YRS



FIXED SODIUM AMYTAL TEST AND RESPONSE TO MECAMYLAMINE *



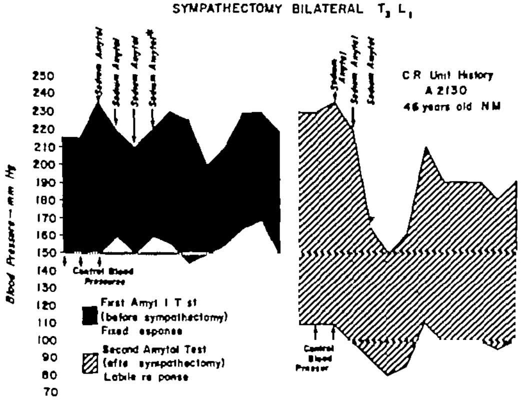
The following is an outline of emergency treatment for acute hypertensive episodes.

A Intravenous Protoveratrine A & B (Veralba 0 2 mg /cc)
   1 Dilute 0 5 cc (0 1 mg) to 10 cc and inject 0 5 cc /min Aim for a blood pressure of 150/100 mm Hg
   2 Wait 5 minutes If there is no fall in blood pressure, repeat the procedure
   3 When the blood pressure falls 20 mm. Hg (systolic or diastolic or both) or if there is nausea or vomiting or irregularity of pulse stop the injection temporarily
   4 When the desired decrease in blood pressure is obtained choose either one of these two courses
      a Continuous intravenous infusion of 2 mg of Protoveratrine (1 ampule) in 500 cc glucose (5% solution) Administer at a rate necessary to achieve the desired blood pressure level without vomiting usually 40-80 drops per 10 minutes Check the blood pressure every 15 minutes
      b Intramuscular therapy

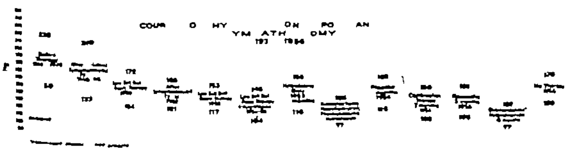
B Intramuscular Protoveratrine A & B (Veralba 0 2 mg /cc)
   1 Give 0 6 cc (0 12 mg) intramuscularly and check the blood pressure every 15 minutes The maximum effect occurs in 1-2 hours
   2 Repeat with increments of 0 2 cc added or reduced every 4-6 hours depending on the patient s response

C Correction for Overdosage or Side Reactions
   1 Atropine for nausea or vomiting or bradycardia
   2 Ephedrine gr 3/8 intramuscularly for excessive hypotension
   3 Discontinue Protoveratrine

Sympathectomy may be indicated when severe hypertension progresses unfavorably in a patient cannot be relied upon to continue treatment for control of the disorder It should not be considered for patients over 55 years of age or when the blood urea nitrogen is elevated, or when heart is enlarged more than 50% above normal dimensions The great advantage of a sym- is that while it may not control the blood pressure it usually makes the patient responsive to conservative hypot nsive measures.



Fourth Des I Sodium Amytal, 200mgm given Firs T t



CONCLUSIONS

Most patients with essential hypertension exhibit the disorder in a mild or a moderately severe form and both these forms are amenable to conservative therapy A clinical survey establishing a severity index of the hypertensive disease processes affords a valuable means of measuring progress This index can serve also as a guide in the selection of therapy

The restriction of sodium intake enhances the effects of hypotensive drugs and of sympathectomy

Combinations of hypotensive drugs such as rauwolfia and veratrum viride or rauwolfia phenoxybenzamine and protoveratrine or rauwolfia with mecamylamine are more effective than any one of these drugs used singly

Mecamylamine is a potent hypotensive drug useful in the control of severe cases of hypertension which have not responded to more conservative measures and in the management of hypertensive crises

Sympathectomy for hypertension is rarely indicated It is of value for patients with severe and progressive hypertension who either cannot tolerate ganglionic blocking agents or who cannot be relied on to carry out in detail home treatment with these drugs This home treatment is an essential feature in the achievement of good control and the prevention of tragic complications

Unless there is renal decompensation the measures now available for the control of hypertension when suitably applied will restore the blood pressure to relatively safe levels and probably improve the general vascular condition of most patients suffering from essential hypertension

Honorable
Mention

Regulation of Physical Activity in Management of Chronic Disease Energy Costs of Various Activities in Work and Play *Edward E. Gordon, Michael Reese Hospital, Chicago.*

Regulation of physical activity is important principle in the management of chronic disease. It applies permanently to conditions of impaired pulmonary function with consequent reduction of work capacity. Regulation may be advisable during convalescence when, after prolonged rest in bed, deconditioning phenomena supervene. In cardiac disease, control of the intensity of physical effort is necessary. Grading of stress is still part of the management of the tuberculous patient. In paraplegia due to any cause it has been shown that some patients so disabled are unable to meet the energy demands of ambulation even for moderate distances. An extensive list of energy costs is available, fact not generally known to the medical profession; these are presented to serve as guide to the physician in determining the applicability of specific activity to his patients' program of management.

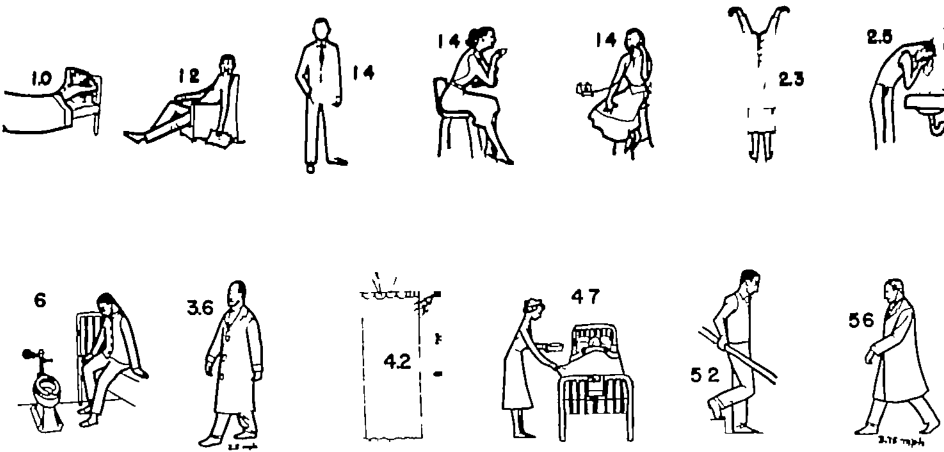
Limitation of physical effort is practiced n the management of heart disease, emphysema, uberculosis and convalescence from acute disease

"How much should a patient do and yet avoid tress?" "What activities reside within his olerance?"

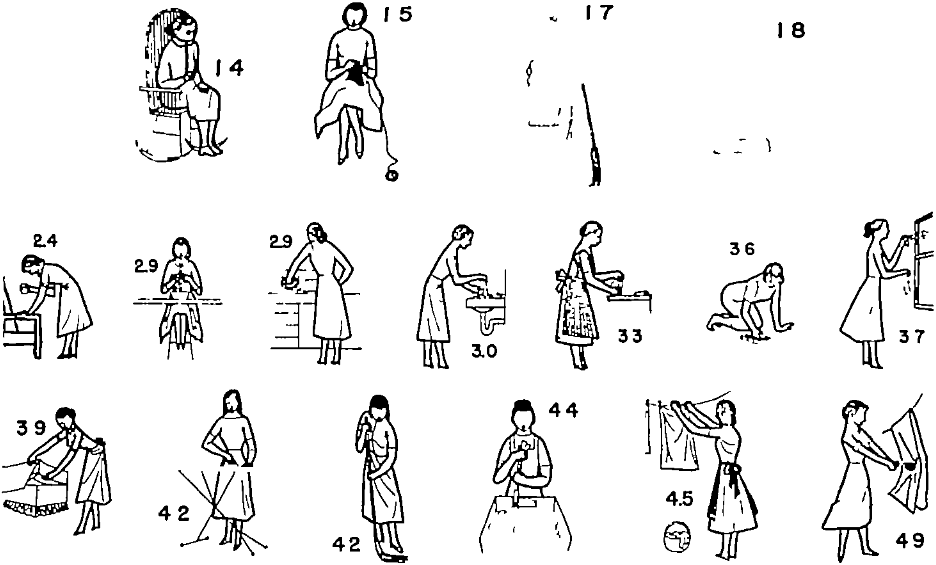
On a practical basis the question of intensity and duration of effort must be decided on clinical grounds But in considering the applicability of any specific activity, its inherent <u>energy</u> <u>cost</u> must be known Such values are available from extensive data on Working Metabolic Rate

To serve as a guide to the physician, some energy costs for self-care, work and play in adults are presented

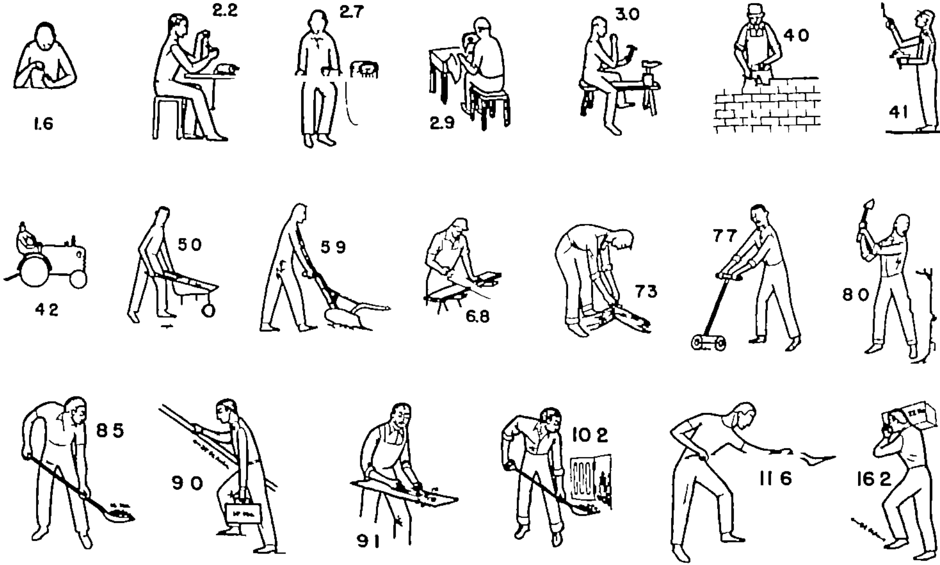
The unit of energy cost has been chosen as Cal /min because, when so expressed, the basal expenditure is about unity, making for numerical simplicity (0 9–1 3 Cal/min) Working cost includes the basal expenditure



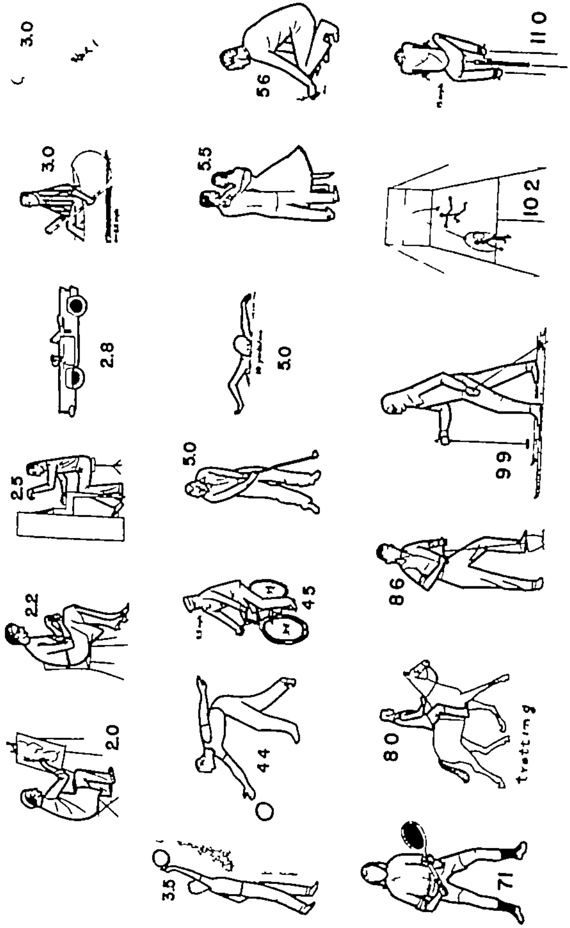
Self-care



Housework



Occupation



Recreation

Honorable Mention

Cellular Pathology in Diseases of the Ear Nose and Throat William T K. Bryan and Marian P Bryan, Washington University School of Medicine St Louis.

Many diseases have distinctive cellular patterns which can be used for diagnostic purposes. The exhibit shows cellular pathologic changes in the following diseases: (1) inflammations such as common cold measles (nasal secretion) herpes labialis, allergy acute otitis media mastoiditis; (2) malignant tumors including carcinoma lymphosarcoma plasmacytoma and rhabdomyosarcoma; (3) benign tumors hyperkeratosis and papilloma; and (4) radiation changes

The material for these studies was obtained mainly by direct swabbing of the area under examination In the nose, although the degenerating epithelial cells are exfoliated in the secretions of the common cold, a better sampling of normal epithelial cell and their variations is obtained by swabbing the nose in the following manner:

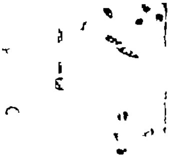
A metal applicator is wrapped with an amount of cotton small enough for the swab to pass under the inferior turbinate without pain or trauma with direct vision The material is gently rolled on a clean glass slide and before drying can occur is placed in a bottle of equal parts of 95% ethyl alcohol and ether Routinely a second slide is made from the opposite side of the nose

Material from tumors was prepared by wiping the lesion or by making a print of the biopsy The slides after fixation are stained according to the Papanicolaou technique

NORMAL CELLS

A Nasal Cells of Epithelial Origin

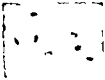
CILIATED COLUMNAR



CILIATED cells are found in large numbers in wiped smears from nose nasopharynx, larynx and bronchus. Note

1. nuclei are oval with finely granular chromatin and one to three nucleoli.
2. Cytoplasm is homogeneous
3. Cilia and ciliary borders are distinct.

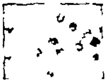
SQUAMOUS



Individual SQUAMOUS epithelial cells with small nuclei and large amounts of thin clear irregular cytoplasm are present with a few scattered neutrophiles.

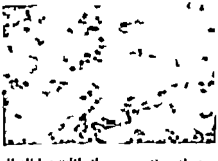
BASAL cells are spherical with round vesicular nuclei and homogeneous cytoplasm. They can be confused with similar small groups of carcinomatous cells.

BASAL



B Cells of Mesenchymal Origin

TONSIL

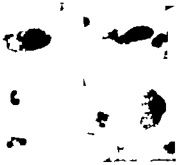


Smears of a Tonsil show mainly mature and immature lymphocytes. There are occasional mitotic figures phagocytes and other cells

The Papanicolaou Technique was used for all slides with the exception that Wright's stain was used for those of Otitis Media and Mastoiditis.

ACUTE UPPER RESPIRATORY INFECTION OR 'COMMON COLD'

During a 'Common Cold the ciliated epithelial cells in the nasal discharge show these changes



1 In early degeneration there is clumping and margination of chromatin,

pink material appears inside the nucleus sometimes attached to a clump of chromatin

the cytoplasm becomes increasingly granular



2 Later the chromatin becomes completely pyknotic a nuclear "halo or circular clear area is seen often with discrete pink or black bodies. Smooth pink globules may appear in the cytoplasm.

3 Finally constriction and separation of the pyknotic nucleus from the ciliated tuft occurs. The separated nuclear fragments are frequently seen to be phagocytized by monocytes There are always many neutrophiles Eosinophiles may be present as well as lymphocytes and other monocytes



The tufts are numerous during the peak of the cold

In fresh preparations the cilia of both intact cells and tufts are often quite motile during the first part of a cold

OTHER VIRAL DISEASES

The most striking cytological finding in MEASLES is the multinucleated "Giant Cell". Their formation appears to take place in two ways.

The one as in other viral diseases the nuclei may multiply by amitosis; the other as illustrated by the splitting of the necrotic epithelium into a cytoplasmic portion and a nuclear which appears to be a multinuclear giant cell. Acidophilic staining is characteristic.

MEASLES



Another type of "giant cell" is the typical cytological feature of HERPES LABIALIS, Chickenpox (Varicella) and Herpes Zoster. The nuclei are not only multiple but are seen to be enlongated, folded and twisted on themselves.

HERPES LABIALIS



Smears made from the scraping of a bleb from CHICKENPOX show "giant cells" usually considered indistinguishable from those of Herpes Labialis. Note in some cells the thick limiting membrane surrounding the multiple nuclei.

CHICKENPOX (VARICELLA)



ACUTE UPPER RESPIRATORY INFECTION OR 'COMMON COLD'

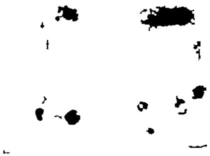
During a Common Cold the ciliated epithelial cells in the nasal discharge show these changes



1 In early degeneration there is clumping and margination of chromatin

pink material appears inside the nucleus sometimes attached to a clump of chromatin

the cytoplasm becomes increasingly granular



2 Later the chromatin becomes completely pyknotic a nuclear 'halo or circular clear area is seen often with discrete pink or black bodies Smooth pink globules may appear in the cytoplasm.

3 Finally constriction and separation of the pyknotic nucleus from the ciliated tuft occurs The separated nuclear fragments are frequently seen to be phagocytized by monocytes There are always many neutrophiles Eosinophiles may be present as well as lymphocytes and other monocytes



The tufts are numerous during the peak of the cold
In fresh preparations the cilia of both intact cells and tufts are often quite motile during the first part of a cold.

OTHER VIRAL DISEASES

The most striking cytological finding in MEASLES is the multinucleated ' Giant Cell Their formation appears to take place in two ways

The one as in other viral diseases the nuclei may multiply by amitosis, the other as illustrated by the splitting of the necrotic epithelium into a cyto plasmic portion and a nuclear which appears to be a multinuclear giant cell Acidophilic staining is characteristic

MEASLES



HERPES LABIALIS



Another type of "giant cell" is the typical cytological feature of HERPES LABIALIS Chickenpox (Varicella) and Herpes Zoster The nuclei are not only multiple but are seen to be enlongated folded and twisted on themselves

CHICKENPOX (VARICELLA)



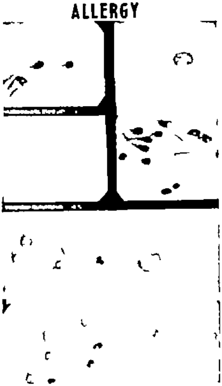
Smears made from the scraping of a bleb from CHICKENPOX show "giant" cells usually *considered indistinguishable* from those of Herpes Labialis Note in some cells the thick limiting membrane surrounding the multiple nuclei

ALLERGY

Columnar epithelial cells wiped from an allergic nose show marked edema and vacuolization of cytoplasm

Note stages in the formation of goblet cells The cilia degenerate as the edema progresses.

Routine observation of the epithelial cells helps to complete the diagnosis made by the ratio of eosinophiles and neutrophiles Allergic noses often have periods without eosinophiles yet goblet forms tend to persist during those times



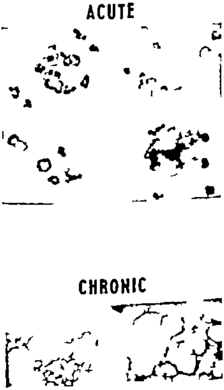
OTITIS MEDIA and MASTOIDITIS

Exudates from the ear show varying numbers of

NEUTROPHILES LYMPHOCYTES
EOSINOPHILES BASOPHILES
PHAGOCYTES often engorged or giant

Large numbers of giant phagocytes persisting in ear discharge are an indication of relatively severe acute ear infection.

Smears from chronic otitis media and mastoiditis show an increase in bacteria fatty degenerated epithelium degenerated neutrophiles and often increase in lymphocytes and eosinophiles The presence of phagocytes in the chronic ears usually indicates an acute exacerbation.



MALIGNANT TUMORS

Examples of cancer from various parts of the field of Otolaryngology are shown

Success of Exfoliative Cytology depends on the property that tumor cells have of breaking away from the main mass that cancers are friable Diagnosis at the cytological level rests on the fact that malignant cells exhibit deviations from normal in all degrees of manner and severity

CANCER of the EAR



IRREGULARITY *is the key word in*

SIZE and SHAPE of

NUCLEUS

CHROMATIN

CYTOPLASM

CRITERIA *for* DIAGNOSIS *of* MALIGNANCY

1. Abnormalities of chromatin in distribution and amount.
2. Enlargement of nucleolus the most important single change
3. Thickening of nuclear membrane
4. Increase in the nuclear-cytoplasmic ratio
5. Alterations in shape common
6. Malignant cells tend to occur in groups.
7. The size and shape of nuclei vary from cell to cell

CANCERS (continued)

Examples of other cancers from various locations are shown in the following order

NASAL SEPTUM
ETHMOIDS AND ANTRUM
PHARYNX COMPLETE
BASE OF TONGUE
LARYNX

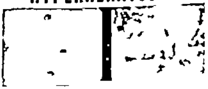


These locations are not reflected in the cytologic pictures although each tumor has individual characteristics The degrees and combinations of change are typical and diagnostic of malignancy Borderline cases and diagnostic problems are not included

Inflammatory cells including neutrophiles lymphocytes monocytes and histiocytes in varying numbers are usually present with the tumor cells

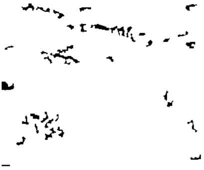
HYPERPLASIAS—BENIGN TUMORS

HYPERKERATOSIS



Groups of cells from hyperkeratosis of the larynx are shown. Cellular proliferation and keratinization are more marked than in the normal but regularity of the cells is essentially maintained

PAPILLOMA



In papilloma the cells are seen in characteristic adherent sheets with dull pale nuclei

from ethmoid above
from larynx below

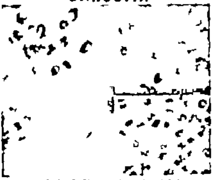
S A R C O M A S

The undifferentiated cells of the upper two pictures are from a sarcoma of a child's antrum.

The cells on the lower left are from a case of lymphosarcoma of the tonsil. Those on the lower right are from lymphosarcoma in the neck.

Note the lobulation, budding of the nuclei with scanty or no cytoplasm. These features are typical of highly malignant cells.

SARCOMA



LYMPHOSARCOMA

The tumor cells of a plasmacytoma from an ear show hyperchromatic and often eccentric nuclei with perinuclear halo. There are bizarre multinucleated cells and abnormal mitotic figures.

The sections of the biopsy of this case were not satisfactory for diagnosis. The smears revealed the type of tumor.

PLASMACYTOMA



This tumor derived from striated muscle (nasopharynx) exhibits large spindle shaped cells with elongated cytoplasmic portions filled with prominent fibriles. The nuclei are grossly abnormal and often enlarged. Striking mitotic figures are seen.

RHABDOMYOSARCOMA

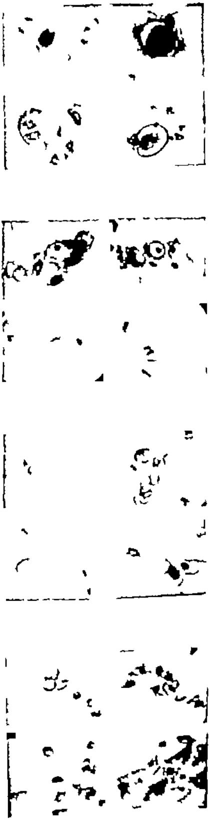


RADIATION CHANGES

Representative changes in groups of cells and in single cells from the nasopharynx larynx and ear during and following therapy are shown

Radiation changes include

1. Increase in size of entire cell
2. Ballooning and vacuoliza tion
3. Cytoplasmic fibrils
4. Duplication of nuclei
5. Bizarre forms



Definite rules for distinguishing malig nant from benign cells during and fol lowing radiation are difficult to make

Effects of radiation may be seen as early as the second day of treatment. Most marked changes were noted during the second and third weeks

In one case of reticulum cell sarcoma of the nasopharynx changes were seen even three years after therapy without any clinical evidence of tumor

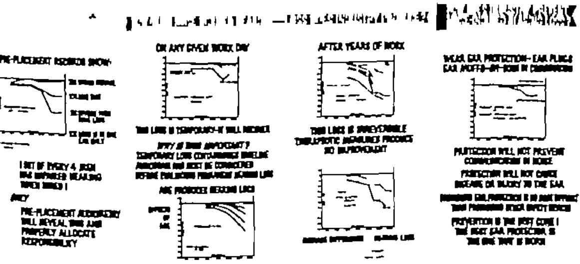
The number of neutrophiles increases with start of treatment and diminishes toward the end of treatment

A marked response to irradiation is thought to be correlated with favorable clinical results

Certificate
of
Merit

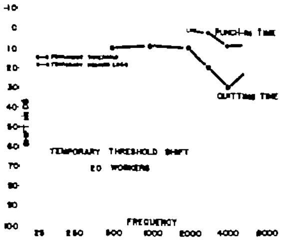
Your Ear and Noise Aram Glorig D E. Wheeler and H P House Sub-committee on Noise in Industry American Academy of Ophthalmology and Otolaryngology Los Angeles.

This exhibit is designed to present the most recent information on the relations of hearing loss to noise exposure It shows (1) how much hearing loss industry buys (2) how much hea ing loss industry produces and (3) how industry prevents noise-induced hearing loss. There is also an audio demonstration through earphones which illustrates what various industrial noises sound like and what it is like to have a hearing loss.



HOW MUCH NOISE-INDUCED HEARING

ON ANY GIVEN WORK DAY



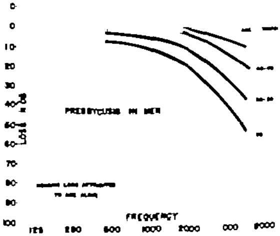
THIS LOSS IS TEMPORARY–IT WILL RECOVER

WHY IS THIS IMPORTANT?

TEMPORARY LOSS CONTAMINATES BASELINE AUDIOGRAM AND MUST BE CONSIDERED BEFORE EVALUATING PERMANENT HEARING LOSS

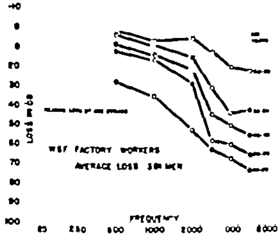
AGE PRODUCES HEARING LOSS

EFFECTS OF AGE

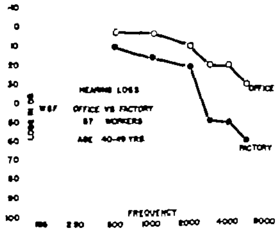


LOSS DOES INDUSTRY PRODUCE?

AFTER YEARS OF WORK



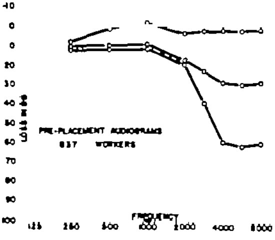
THIS LOSS IS IRREVERSIBLE
THERAPEUTIC MEASURES PRODUCE
NO IMPROVEMENT



AVERAGE DIFFERENCE IN HEARING LOSS

HOW MUCH HEARING LOSS DOES INDUSTRY BUY ?

PRE-PLACEMENT RECORDS SHOW



75% WITHIN NORMAL

10% LIKE THIS

5% SEVERE HIGH TONE LOSS

10% LOSS IS IN ONE EAR ONLY

AN AUDIOGRAM IS RECORD OF A HEARING TEST

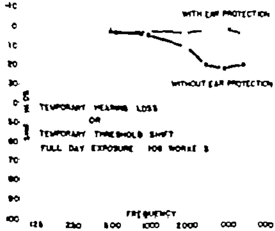
1 OUT OF EVERY 4 MEN HAS IMPAIRED HEARING WHEN HIRED !

ONLY

PRE-PLACEMENT AUDIOMETRY WILL REVEAL THIS AND PROPERLY ALLOCATE RESPONSIBILITY

HOW DOES INDUSTRY PREVENT NOISE-INDUCED HEARING LOSS?

WEAR EAR PROTECTION–EAR PLUGS EAR MUFFS–*OR*–BOTH IN COMBINATION



PROTECTION WILL NOT PREVENT COMMUNICATION IN NOISE

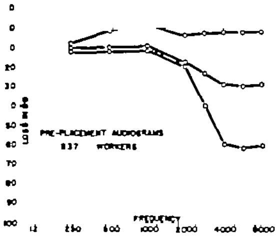
PROTECTION WILL NOT CAUSE DISEASE OR INJURY TO THE EAR

PROMOTING EAR PROTECTION IS NO MORE DIFFICULT THAN PROMOTING OTHER SAFETY DEVICES

PREVENTION IS THE BEST CURE ! THE BEST EAR PROTECTOR IS THE ONE THAT IS WORN

HOW MUCH HEARING LOSS DOES INDUSTRY BUY ?

PRE-PLACEMENT RECORDS SHOW



75% WITHIN NORMAL

10% LIKE THIS

5% SEVERE HIGH TONE LOSS

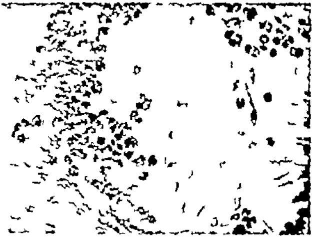
10% LOSS IS IN ONE EAR ONLY

AN AUDIOGRAM IS RECORD OF HEARING TEST

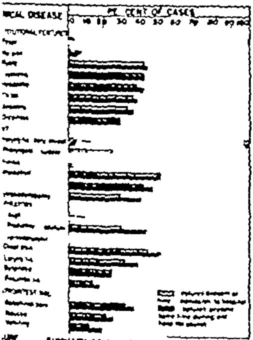
1 OUT OF EVERY 4 MEN HAS IMPAIRED HEARING WHEN HIRED !

ONLY

PRE-PLACEMENT AUDIOMETRY WILL REVEAL THIS AND PROPERLY ALLOCATE RESPONSIBILITY

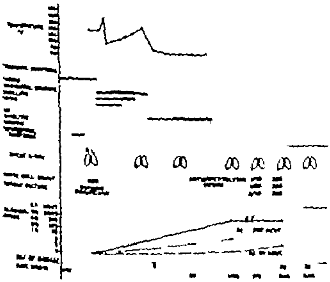


Application of human cell tissue culture to the problem of respiratory illness etiology provided major advances in the independent discovery by Hilleman, et. al. and by Rowe et. al. of a new family of viruses now known as the Adenoviruses (formerly RI, RI-67, APC, ARD). The agents originally described by Hilleman were recovered from patients with respiratory disease while those of Rowe were recovered as masked agents from surgically removed human adenoids being cultivated in tissue culture. Adenoviruses cause many of the cases of febrile acute respiratory illnesses of man including the syndromes of undifferentiated acute respiratory disease (ARD), non-Streptococcal exudative pharyngitis, atypical pneumonia, bronchitis resembling atypical pneumonia (B APL) and pharyngoconjunctival fever. Primary isolation of type 4 strain RI-67 was made in human tracheal epithelium tissue culture. The virus caused degeneration of the human epithelial cells (shown at left) and failed to produce disease in common laboratory hosts.



SUMMARY OF CLINICAL FEATURES IN 45 HOSPITALIZED CASES OF RESPIRATORY ILLNESS CAUSED BY RI VIRUS

As shown on the chart at the left, the most prominent clinical features in hospitalized cases of acute respiratory illness of Adenovirus etiology among recruits are fever, pharyngitis, and severe cough. The myalgia which is frequently present is usually mild. About half the cases develop exudate on the hyperplastic lymphoid tissue in their throats and half show signs of bilateral follicular conjunctivitis. Lymphadenopathy of the head and neck is prominent. Roughly 15% of the cases develop positive x-ray evidence of pneumonitis and a larger proportion of the patients present evidence of tracheobronchitis. In the group of 45 cases studied, the fever lasted 6 days on the average and the mean maximal temperature was 103°F. The average duration of hospital stay was 10 days.



The chart on the left illustrates the record of a patient with type 7 Adenovirus infection and pneumonic involvement. The Adenoviruses have no etiologic relationship to the ordinary common cold. Viruses of the Adenovirus family have been involved in certain cases of mesenteric lymphadenitis (Kjellen) and in patients with keratoconjunctivitis (Jawetz).

ETIOLOGY

The Adenoviruses may be studied readily in the laboratory They may be propagated in a variety of human cells in tissue culture (HeLa KB human intestine human amnion monkey kidney) in which they cause cytopathogenic (degenerative) changes This microscopic cellular change is specifically related to viral growth and provides an indicator in titrations of viral infectivity

Neutralizing and Complement Fixing Antibody Response Against Selected Virus Strains in Patients With RI Group Infection

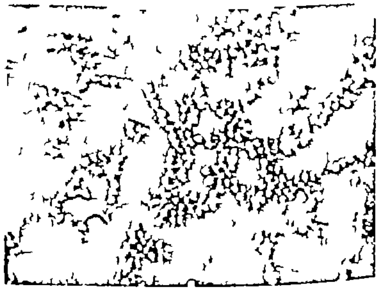
Patient No	Specimen	Neutralization titer against strain RI 67	RI 218	RI CI	AD-6	C.F titer against strain RI-67	RI 218	RI CI	AD-6
1	Acute	0*	0	0	0	0	0	0	10
	Conv	128	128	128	0	80	80	80	80
2	Acute	8	0	2	2	5	0	5	5
	Conv	8	32	8	2	40	40	80	40
3	Acute	0	8	0	8	10	10	10	20
	Conv	32	8	32	8	40	80	80	80
4	Acute	0	0	0	0	5	5	10	10
	Conv	32	0	32	0	80	80	160	160

* Numbers are reciprocals of serum titers 0 equals titer less than 1 2 in neutralization and less than 1 5 in C F tests

The Adenoviruses constitute a family of agents which are antigenically heterogeneous as demonstrated by neutralization tests in tissue culture with paired sera from human cases of the disease or with monotypic animal antisera. There are at least 14 different immunological types of the Adenoviruses of human or simian origin (Huebner, Rowe, Berge, Hilleman). All the viruses of the group possess a common group-specific complement-fixing antigen.

Only a few of the types, i.e. 3, 4, & 7 have been found in association with epidemic respiratory disease in man. Types 4 and 7 are the more common in military cases. Most of the other types cause only sporadic disease and are usually found as latent viruses in human adenoids or in tonsillar tissue (Huebner, Rowe).

The Adenoviruses may be purified from infected tissue culture material by differential centrifugation and filtration techniques. Purified type 4 (RI-67) virus shown at the right consists of spherical particles which are about 109 mμ diameter as measured by ultracentrifugation, 80-120 mμ based on ultrafiltration and around 93 mμ by electron microscopy. The soluble CF antigen which can be readily separated from the virus does not exceed the 24-40 mμ size range. (Electron micrograph by A. J. Tousimis.)



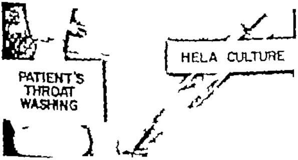


As shown by Kjellen et al. and by Harford et al. the nuclei of cells infected with Adenoviruses may contain large numbers of particles in crystal-like array. The particles shown in cluster in the cell nucleus at the left measure about 70 mμ in diameter. The larger of the particles [illegible] about 100 mμ [illegible] consistent with the expected size of hydrated particles. (Electron micrograph by A. J. Tousimis).

DIAGNOSIS

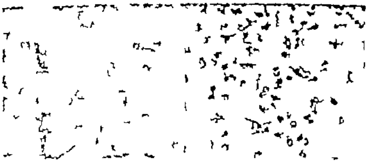
For routine diagnostic and research purpose the Adenoviruses are cultivated in HeLa cells (derived from human epidermoid carcinoma by Gey) HeLa cells are propagated indefinitely in series in bottles without returning to the human host After HeLa cell cultures have grown out in a complex medium containing human serum (which often contains antibodies against the Adenoviruses), the sheets of culture cells are washed and then bathed in maintenance solution containing normal chicken serum

OLATION



Throat washings collected from the patient are inoculated into cultures of HeLa (human epidermoid carcinoma cells).

Virus, when present, grows in the HeLa cells causing cellular degeneration, i.e., cytopathogenic change.



UNINFECTED INFECTED (RI-67)

HeLa cultures viewed under 75 magnification

SEROLOGY

The recovered virus is identified in the complement-fixation test or the tissue culture neutralization test employing known positive antisera

Result of Neutralization and Complement Fixation Tests with the RI 67 Agent and Sera from Individual PAP, ARD, and Influenza Cases, Fort Leonard Wood Epidemic

Patient	Clinical Diagnosis	Serum Date	Serum Day dis	Neutralization Test Result* Serum dilution 1:2	1:8	1:32	1:128	1:512	Titer	C.F. titer
#37	PAP	1/3/53	3	4+	4+	4+	4+	4+	<1:2	<1:8
		1/13/53	13	0	0	3+	4+	4+	1:8	1:40
		2/2/53	33	0	0	0	0	3+	1:128	1:80
#34	ARD	1/3/53	2	4+	4+	4+			<1:2	1:5
		1/13/53	12							1:40
		2/4/53	34	0	0	0	0	3+	1:128	1:80
#13	Influenza A prime	12/16/52	1	0	2+	4+			1:2	<1:8
		1/9/53	22	0	2+	4+			1:2	<1:5

* Numbers indicate degree of cell sheet degeneration. 4+ =100% degeneration, 3+ 75%, 2+ 50%, 1+ 25%, 0=<25%

Laboratory diagnosis may be accomplished readily by appropriate serological procedures. These tests involve the demonstration of a 4-fold or greater increase in amount of C.F. or neutralizing antibody in the patient's serum during the progress of this disease. Patients with influenza and other infections do not show such increase.

EPIDEMIOLOGY

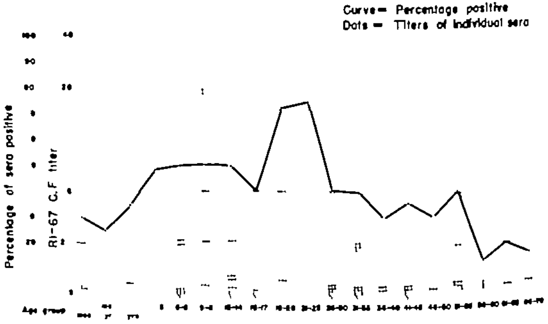


Figure Age frequency distribution of RI-67 complement-fixing antibody in sera of normal population

Experience with the Adenoviruses is widespread in the population as shown by the presence of Adenovirus group-specific C.F. antigen in American [illegible] all age groups

Acute respiratory illnesses of Adenovirus etiology occur in military camps at all seasons of the year. Greatest prevalence is in the winter. The year-round prevalence of Adenovirus infection indicates that the virus resides continuously in the human population and that at least 1 means for perpetuating the disease is by contact. [illegible] cases Adenovirus disease is infrequent in Posts which have no recruit training activity and are populated by seasoned men only. Illustrative of this is Camp Carson (now Fort Carson) which was not a recruit training base at the time of the study.

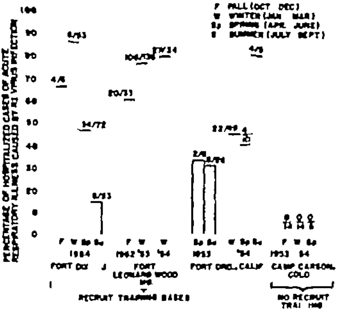
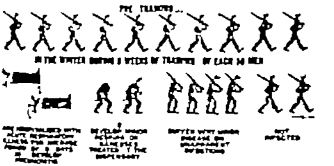


Figure 3 Occurrence of RI virus infections among hospitalized cases of acute respiratory illness in military personnel 1952-1954 by season

PROBLEM ACUTE RESPIRATORY ILLNESS OF RECRUITS CAUSED BY ADENOVIRUSES (RI)



Most recruits become infected with Adenovirus during later training with the development of severe, mild, or inapparent disease as shown at the left. During summer training, only 1 of each 10 men become infected but the proportion of severe, mild, or inapparent disease among these persons is roughly the same as in the winter.

DURING AN ENTIRE YEAR, 1 OUT OF EVERY 10 RECRUITS IS HOSPITALIZED FOR THIS DISEASE.

Epidemic influenza may occur simultaneously with Adenovirus epidemic. Some persons suffer dual infection with influenza and Adenovirus in such outbreaks. Epidemic influenza A typically occurs as a single explosive outbreak of 3 or 4 week duration. Adenovirus infections, which occur as explosive outbreaks in the newly formed companies of men, continue with high prevalence during the 5 or 6 cold months of the year owing to the continuous introduction of new susceptible recruits into the Post.

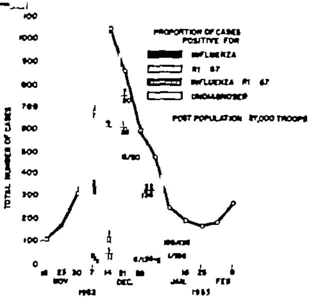


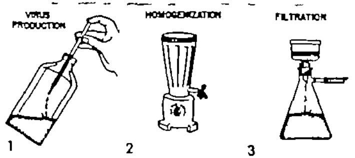
Figure 5 Outbreak of acute respiratory illness epidemic at Fort Leonard Wood, Mo. 1952-1953, showing estimate of proportion of cases of RI, influenza or unknown etiology based on serological tests of sample of cases

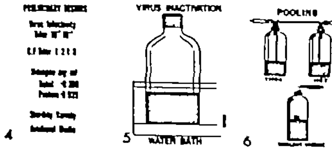
PREVENTION BY VACCINE

Because of the high incidence acute respiratory illnesses of Adenovirus etiology present a major medical problem to the Armed Forces in time of peace and more prominently in time of war The new Adenovirus vaccine developed at the Walter Reed Army Institute of Research promises to reduce the incidence of such disease drastically

VACCINE DEVELOPMENT

PREPARATION AND TESTING OF ADENOVIRUS VACCINE





1 Tissue cultures of monkey renal epithelium maintained in serum free Synthetic Mixture 199 with antibiotics are inoculated with type 4 (RI-67) or type 7 (RI-4-202) Adenovirus and then incubated at 36° C.

2 When the cultures have degenerated completely 4 to 7 days post-inoculation, the whole culture is harvested and homogenized in Waring blender.

3 Following preliminary clarification by centrifugation, the infectious fluid is passed through a sintered glass filter of medium porosity.

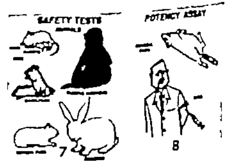
4 The filtered uninactivated virus stock must pass rigid test requirements.

5 For virus inactivation, freshly redistilled formalin in a final concentration of 1:4000 is added and the mixture is incubated at 36° C for 6 days, twice the time necessary to inactivate the Adenovirus.

6 Following stringent tests in tissue culture to detect remaining viable Adenovirus, the monovalent types 4 & 7 stock are pooled in equal amounts to give the final bivalent vaccine pool.

7 Final safety tests in tissue culture and animals are performed to detect viable viruses including Adenovirus, poliomyelitis, B virus, neurotropes, wild viruses, etc. The artificial media test for viable bacteria, fungi, yeasts, Leptospira.

8 Guinea pigs given a single 0.25 ml dose of vaccine intramuscularly must develop homologous neutralizing antibody and the vaccine must induce neutralizing antibody against type 3, 4 & 7 in man.



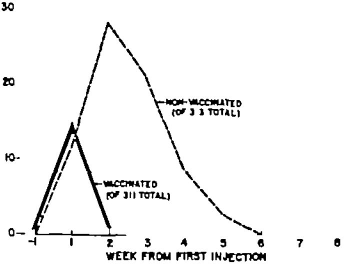
SEROLOGICAL RESPONSE IN MAN TO BIVALENT TYPE 4 AND 7
KILLED RI VACCINE OF MONKEY KIDNEY ORIGIN

SERUM SPECIMENS	NEUTRALIZING ANTIBODY TITER VS HOMOTYPE	HETEROTYPE	RI GROUP OF ANTIBODY
PRE VACC. / WEEK POST VACC.	[illegible]	[illegible]	
PRE VACC. / WEEK POST-VACC.	[illegible]		
PRE VACC. / WEEK POST VACC.	[illegible]	[illegible]	
PRE-VACC. / WEEK POST-VACC.	[illegible]	[illegible]	

[illegible] EQUALS LESS THAN [illegible] EQUALS LESS THAN

A[illegible] shown in the chart, human volunteers given [illegible] single 1 ml dose of vaccine intramuscularly of the bivalent vaccine develop neutrali[illegible]ing antibody against not only homotype 4 and 7 but equ[illegible] [illegible] heterotype 3 virus [illegible] well. These titers, which reach maximum level [illegible]ithin 2 week[illegible] post-inoculation, are [illegible] great as those ordinarily found following natural infection [illegible] and appear to be elicited largely on [illegible] recall basis.

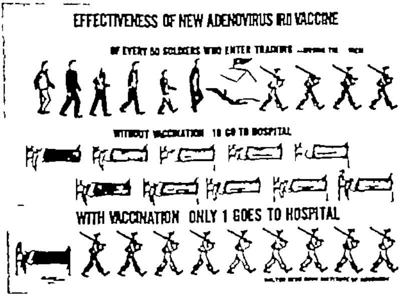
VACCINE EVALUATION



OCCURRENCE OF HOSPITAL CASES OF ACUTE RESPIRATORY ILLNESS OF SEROLOGICALL[illegible] PROVED ADENOVIRUS ETIOLOGY IN VACCINATED AND CONTROL GROUPS

The chart at the left show[illegible] the results of the field evaluation [illegible]arried out at Fort Dix, N. J. during the winter of 1956 when 71% of [illegible]ll hospital cases [illegible]f acute respiratory illness were caused by Adenoviruses. The vaccine became effective 1 week post-inoculation after which time 61 cases occurred in the control [illegible] and only 1 in the vaccinated.

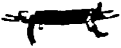
THUS, THE USE OF THE VACCINE EFFECTED A 98% REDUCTION IN EXPECTED CASES OF ADENOVIRUS DISEASE.



Roughly 20% of all recruit[illegible] who undergo basic training in the cold month[illegible] are hospitalized for acute respiratory illne[illegible] of Adenovirus etiology. Employment of the vaccine might be expected to reduce th[illegible] occurrence to only 2% or less.

EXPECTED SAVINGS FROM ADENOVIRUS (RI) VACCINATION (ARMY ALONE)
(PRESENT STRENGTH)

COST WITHOUT VACCINATION



33,000 CASES $280 00 EACH = $9 240 000 00
(INCLUDES HOSPITAL PLUS MAN DAYS LOST)

COST WITH VACCINATION



3,300 CASES $280 00 EACH = $924 000 00
COST OF VACCINATION = $660 000 00
(ESTIMATE $2 00 PER SHOT)

TOTAL = $1,584 000.00

SAVINGS PER YEAR = $7,656,000 00

PLUS INCREASED OPERATING EFFICIENCY
HIGHER TROOP MORALE



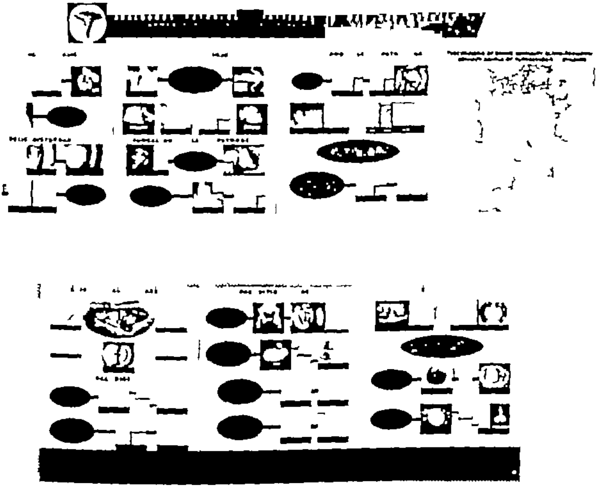
WALTER REED ARMY INSTITUTE OF RESEARCH

Currently the Army alone trains 330,000 new recruits per year. The savings in cost for hospitalization and for manpower loss resulting from vaccination should be considerable when applied to all branches of the Armed Forces. Even greater importance of preventing disease is during periods of mobilization for war when disruption of the troop-training program may have serious consequences.

There is no specific therapeutic treatment for Adenovirus infections The therapy of the disease is symptomatic and may include inhalation codeine aspirin bed rest and adequate fluid intake

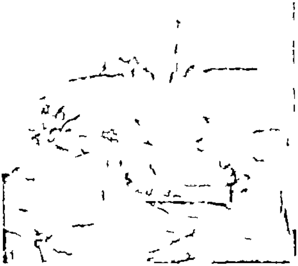
Analogous Pathologic Patterns in Man and Animal Thomas C. Jones, Charles N. Barron, and Robert M. McCully Armed Forces Institute of Pathology Washington, D C.

The exhibit shows a comparison of pathogenic entities in animals with similar diseases in man with a view to suggesting areas for research in animal diseases with application to the human subject It describes meta bolic disorders neoplasia and diseases due to infection. Diseases with par ticular application to military medicine or aeromedical research are also emphasized



CONGENITAL ANOMALIES

The development of heart and great vessels are basically similar in man and other animals This similarity is exemplified in congenital anomalies



Double aortic arches man AFIP Acc 273995



Double aortic arches domestic bovine AFIP Acc. 762508

Man and other animals share a wide variety of physiologic and anatomic anomalies of congenital origin Animals may serve as useful investigative tools with regard to pathogenesis pathology, inheritance and treatment



Bilateral congenital dysplasia and dislocation of hip man AFIP Acc. 289924



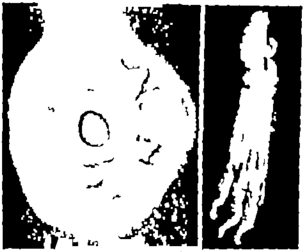
Bilateral congenital dysplasia and dislocation of hips dog. AFIP Acc. 724578

METABOLIC DISTURBANCES

The unexplained physiologic basis of secondary pulmonary hypertrophic osteoarthropathy is generally related in man and other animals to similar space-occupying lesions in the thoracic cavity It is common in dogs

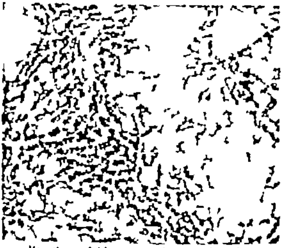


hypertrophic osteoarthropathy secondary to lung man. AFIP A c. 121454



P lmonary hypertrophic osteoarthropathy econdary to SPIROCERCA LUPI infection and rteo arcoma l terminal esophagus dog. AFIP A 677310

e morphology and pathogenesis of amyloidosis appear generally similar in man and animals



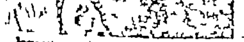
Hepati amyloido l secondary to tubercolo l man. AFIP Acc. 730513



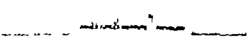
Hepatic amyloido l econdary to generali ed coccidioidomycosi horse. AFIP Acc. 718613

^CTION TO INJURY

ies, accidental or otherwise gunshot wound or automobile accident may occur animal species Much of the basic knowledge of reaction to injury comes from / of animals



Spermatic granulom f epididymi dog. AFIP Acc. 749173



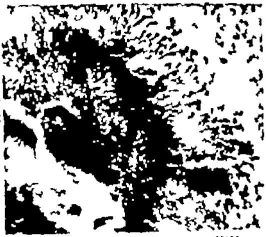
Spermatic granuloma of epididymi dog. AFIP Acc 749173

FUNGAL AND RELATED PATHOGENS

The lesions produced by ACTINOMYCES BOVIS in man and cow are essentially the same The organism has been found only in mammalian hosts

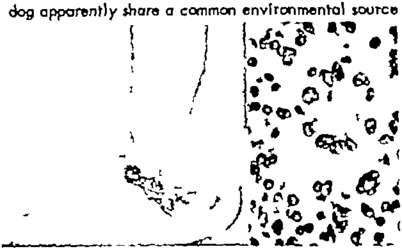


Actinomycosis, man. AFIP Acc. 167249



Actinomycosis, cow AFIP Acc. 129816

BLASTOMYCES DERMATIDITIS causes comparable superficial and systemic reactions in man and other animals A number of cases have been observed in dogs Man and dog apparently share a common environmental source of infection

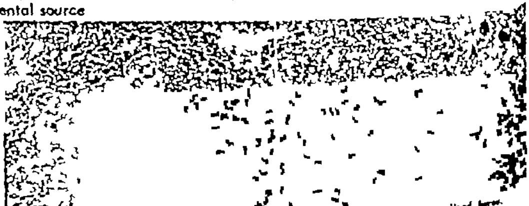


North American blastomycosis. AFIP No 55-15884



North American blastomycosis, dog. AFIP Acc. 205377

Coccidioidomycosis has been observed in a number of mammals in addition to man Cow dog gorilla horse and rodents may be infected apparently from a common environmental source



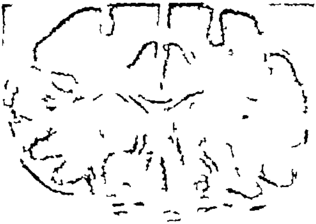
Coccidioidomycosis, lymph node, man. AFIP Acc. 626435

Coccidioidomycosis, generalized, horse. AFIP Acc. 738613

cryptococcosis has been observed in a number of mammals including monkey, horse, cow, dog cat and pig Man and animals may be infected a common source



Cryptococcosis, brain, man. AFIP Acc. 270323

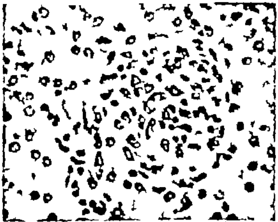


Cryptococcosis brain, [illegible] AFIP Acc 523653

stoplasmosis is an important disease of man and dog Sources of infection as well patterns of reaction are shared



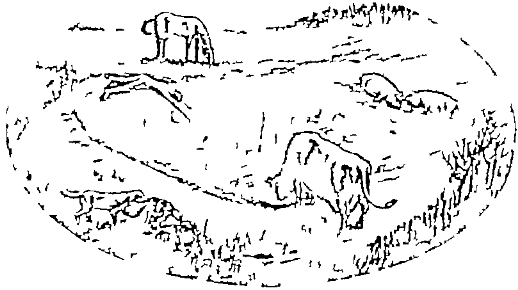
Histoplasmosis of tongue, man. AFIP Acc. 311914



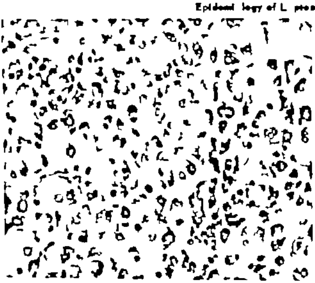
Histoplasmosis of liver dog AFIP Acc. 170582

UBERCULOSIS of bovine mammary gland – formerly a common source of tuberculosis in children

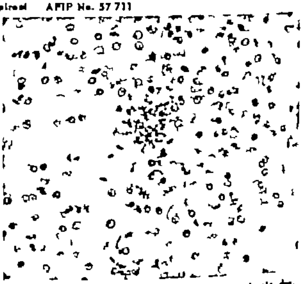




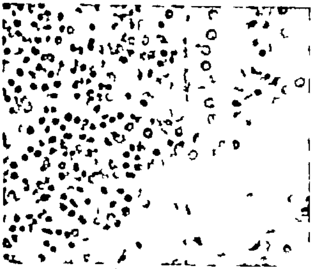
Epidemiology of Leptospirosis AFIP No. 57 711



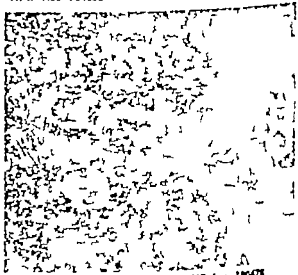
Dissociation of hepatic cord cells in Leptospirosis, man. AFIP Acc 218921-3



Dissociation of hepatic cord cells in Leptospirosis, dog. AFIP Acc 704885



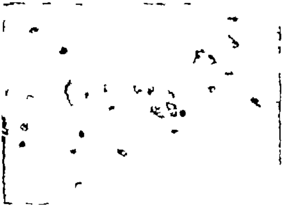
Leptospiral kidney, man. AFIP Acc. 154238



Leptospiral kidney, dog. AFIP Acc. 190678

IRAL DISEASES

Rabies is a disease common to warm-blooded animals The epizootiology of the disease in animals especially dogs, wild carnivores and bats is important to the health and welfare of man

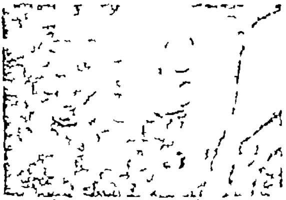


Rabies; negri bodi i neuron f hippocampus, man. AFIP Acc. 107367



Rabi ; negri bodi i neuron f hippocampus, dog. AFIP Acc. 266501

Analogous pathologic patterns may be caused by different agents in non-related species Study of these patterns often leads to discovery of new host-parasite relationships



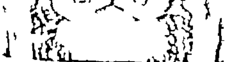
Giant-cell pneumoni in mea l s, man. AFIP A c. 776054



Giant-cell pneumoni in canine distemper dog. AFIP Acc. 114213

ARASITIC DISEASES

The pork tapeworm (TAENIA SOLIUM) utilizes man as both a definitive and intermediate host The domestic pig is usually the intermediate host of importance for continuation of the parasitic species but the cow may also serve



Cysticercus cellulosae (Taeni solium), generalized, man AFIP No. 53-7360



Cysticercus cellulosae (Taenia solium), generalized, bovine AFIP Acc. 578479

Man is an innocent bystander in the ecologic interplay of canine carnivore, his prey and the parasites, ECHINOCOCCUS GRANULOSUS and E MULTILOCULARIS The lesions in the intermediate host are characteristic of the parasitic species regardless of host



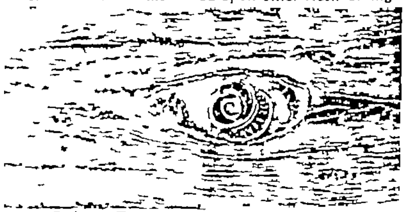
Echinococcus granulosis, kidney man. AFIP Acc. 803601





E hinococcus multilocularis, liver vole. AFIP Acc 646863

The pathologic pattern resulting from infection with TRICHINELLA SPIRALIS is repeated in all mammalian species In order for the parasitic species to survive carnivorous and omnivorous host must feed upon other flesh-eating animals

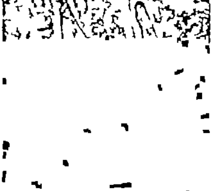


T ichine l (Trichinell spirali) rat AFIP Acc 633554

The pathogenicity of demodectic mites apparently differs between host species and also varies between individuals although the same primary anatomic site is involved The parasite is generally considered host specific

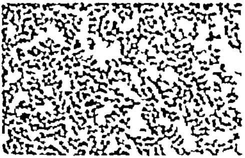


Demod folliculorum skin, man. AFIP A 657255



dog. AFIP Acc. 791124

lignant lymphomas occur in many animal species The counterparts of human frequently can be found in other animal species Study of the animal can aid in understanding and attacking the disease

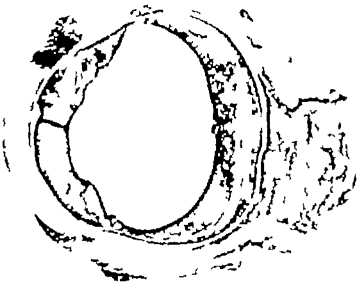


Malignant lymphoma, kidney man AFIP Acc 797508



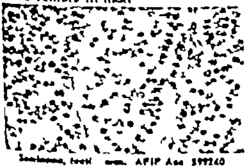
Malignant lymphoma, kidney dog AFIP Acc. 828479

Intraocular malignant melanomas have been recognized with far greater fre- in man than in other animals The proportion of primary iridal to choroidal is much greater in dogs than men Morphology and significance appear ana-

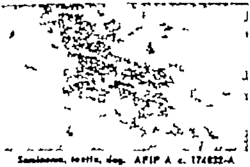


Intraocular malignant melanoma, primary i iris, dog. AFIP Ac 659300

he clinical and pathologic features of seminomas of the testicle of dog or man are losely similar Study of sertoli cell and interstitial cell tumors which are much frequent in the dog, has led to the recognition and better understanding of rare tumors in man



Seminoma, testi man. AFIP Acc 599240



Seminoma, testis, dog. AFIP A c. 174832-A

Certificate of Merit

MILITARY MEDICINE

Newer Approaches to Study of the Liver

George L. Calvy Roald N. Grant, Marvin L. Gliedman and Carroll M. Leevy U S. Naval Hospital, St Albans, N Y

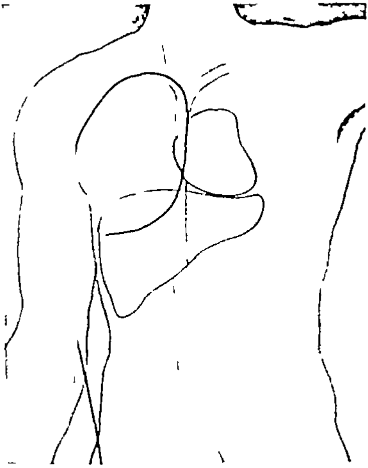
Catheterization of the hepatic vein provide valuable physiological information and offers practical method of sessing the liver in health and disease. This technique was first described by Warren and Brannon in 1944 It permits measurement of blood flow uptake and turnover of metabolite and drugs, pressure gradients, and the detection of shunts or visualization of blood vessel relationships by means of contrast media. Since 1954 at the U. S. Naval Hospital, St. Albans, New York, hepatic catheterization ha been applied in studies of patients with hepatic disease nd portal hypertension. Derived data have been correlated with clinical, biochemical, and histological studies. Thi procedure has been of especial value in patients with portal hypertension in saying result of medical therapy and selection of candidates for surgical portal decompression.



NEWER APPROACHES TO STUDY OF THE LIVER

Catheterization of the hepatic vein provides valuable physiological information [illegible] practical method of assessing the liver in human [illegible]. This technique was first described by [illegible] in 1944. It permits measurement of [illegible] of metabolites and drugs, pressure [illegible] of shunts or visualization of blood vessel relationships by means of contrast media.

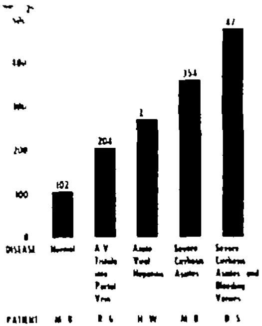
Since 1954, at the U.S. Naval Hospital, St. Albans, New York, [illegible] studies of patients with [illegible] hypertension. [illegible] have been correlated with clinical, biochemical and histological studies [illegible] special value in patients [illegible] results of medical therapy, and selection of candidates for surgical portal decompression.



WEDGED HEPATIC VEIN PRESSURES

Wedging a catheter into a peripheral hepatic ve nule has been found useful in evaluating patients with portal hypertension.

It provides an accurate method of assaying portal vein pressure determining the effectiveness of medical therapy and distinguishing intra-hepatic from extra-hepatic portal block.



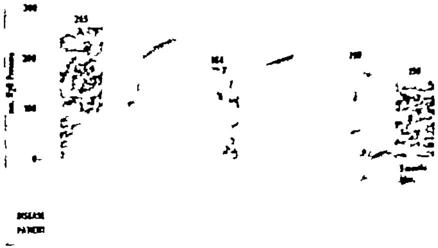
A Survey of Pressures Recorded

	Range in mm H_2O	Mean in mm H_2O
Normal	28 150	82
Cirrhosis:		
Early	82 204	129
Advanced	122 354	258
Ascites	150-462	313
Bleeding Esophageal Varices	150-435	299

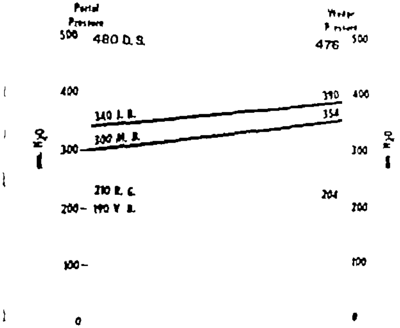
Hepatitis

In the early, acute phase of viral hepatitis wedged hepatic vein pressures may be elevated to values of over 300 mm. H_2O, gradually returning to normal with recovery

SERIAL WEDGED HEPATIC VEIN PRESSURES MAY BE USED TO DETERMINE RESPONSE TO THERAPY AND CORRELATED WITH NEEDLE BIOPSY OF THE LIVER



WEDGED HEPATIC VEIN PRESSURES REFLECT PORTAL VEIN PRESSURES OBTAINED AT LAPAROTOMY

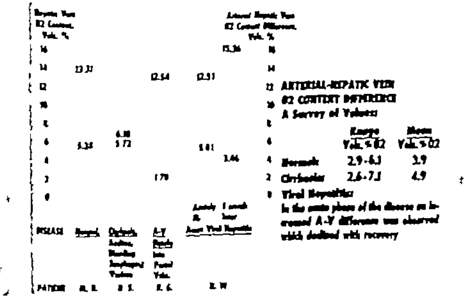


METABOLISM OF THE LIVER

The uptake of oxygen, carbohydrate, fat, protein, and selected drugs, may be determined by hepatic vein catheterization.

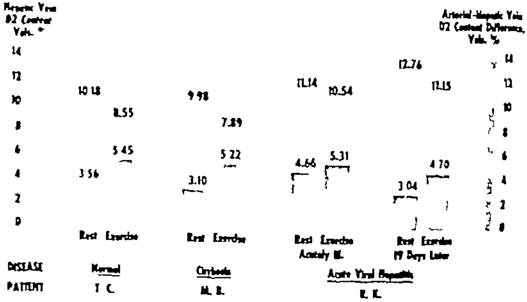
OXYGEN UTILIZATION AT REST

Parenchymal liver disease is reflected by a low oxygen content and a high arterial-venous difference. An arterial shunt into the portal system produces a high hepatic vein blood oxygen content and a low A V difference.

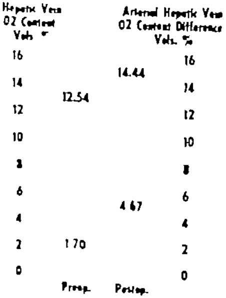


THE EFFECT OF EXERCISE ON HEPATIC VEIN OXYGEN CONTENT

The oxygen content of the hepatic venous blood falls following exercise.



PRE AND POSTOPERATIVE STUDIES OF 02 CONTENT AND ARTERIAL-HEPATIC VEIN DIFFERENCE IN A PATIENT WITH A TRAUMATIC PORTAL VEIN-SUPERIOR MESENTERIC ARTERY FISTULA



The low arterial-venous difference preoperatively reflects the abnormally high arterial blood flow through the liver. With the closure of the shunt arterial-venous difference returned to normal.

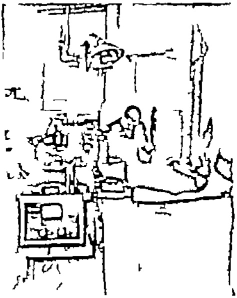
HEPATIC BLOOD FLOW

The Fick principle: measurement of a substance entering the liver (peripheral blood concentration) and on leaving this organ (hepatic vein concentration) permits estimation of the rate of hepatic blood flow. Sulfo-bromophthalein (Bradley), urea (Myers), galactose (Tybjaerg Hansen) and radioactive substances have been employed.

A good correlation has been shown between hepatic blood flows utilizing radioactive colloidal particles and the BSP technique.

Because of the ease of the radio active determination we have changed to this method.

Hepatic Blood Flow estimated by the BSP method has given mean values that range from 1260 ml. to 1580 ml./min. The range of means using colloidal particles has been from 1000 to 1800 ml./min.



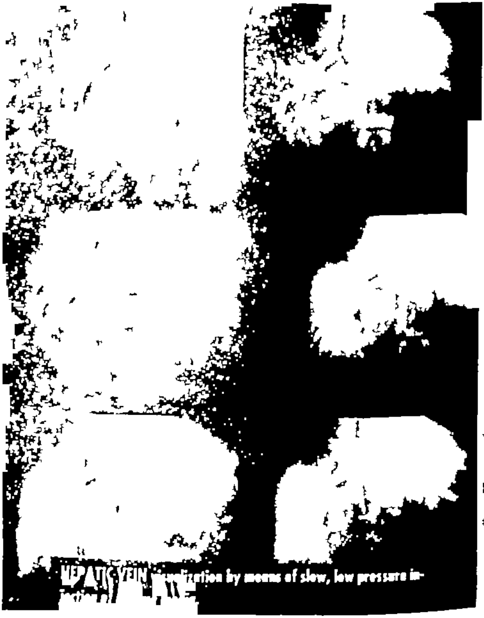
The hepatic blood flow may be determined by measuring the disappearance rate of colloidal gold from the peripheral vascular system, in this case the femoral artery

ILLUSTRATIVE CASES

Patient	Diagnosis	Extraction Ratio/min.	Blood Volume	Hepatic Blood Flow, ml./min.
H. M.	Normal.	.308	5775	1780
A. B	Acute Hepatitis.	193	5400	1040
M. B.	Cirrhosis, Ascites & Varices	.087	5100	440
R. G.	Arterio-Venous Fistula into Portal Vein, Preop.	.380	5040	1920
	Postop.	175	5500	950

HEPATOPHLEBOGRAPHY

The injection of radiopaque material through the catheter within hepatic veins has permitted both experimental and clinical observations on the hepatic vasculature The opaque media may be used to outline the hepatic venous system or forced through the sinusoidal system to outline the portal and splenic systems



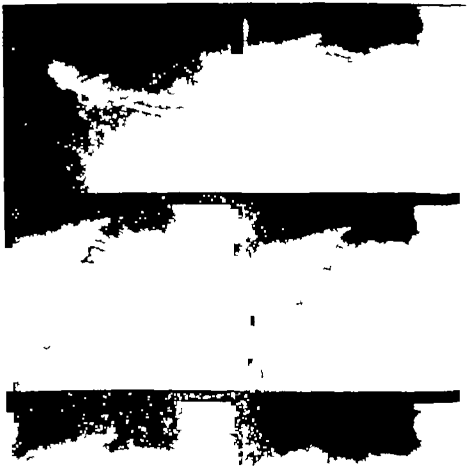
HEPATIC VEIN visualization by means of slow, low pressure in- [illegible]

PORTAL VEIN [illegible]



PORTAL AND SPLENIC VE[illegible] high-pressure injection [illegible] powers.





IN THE FUTURE, serial pressure measurements and venography, in combination with clinical evaluation biochemical tests and needle biopsy, will help clarify many of the current problems relating to pathophysiology and treatment of portal hypertension.

Attention to the influence of disease diet drugs and exercise on hepatic blood flow oxygen extraction and metabolic activities, now facilitated by technical advances will greatly increase our understanding of the liver

The Relationship of Hydrocephalus to Myelomeningocele and to Hydromyelia. W James Gardner and Jorge Angel Cleveland Clinic, Cleveland

The authors' experience indicates that embryonal atresia of the outlets of the fourth ventricle is responsible for various deformities of the hind-brain, the most common of which is the Arnold-Chiari malformation. Since in the embryo the central canal of the cord is part of the ventricular system, hydromyelia and myelomeningocele may result from the hydrocephalus that accompanies such atresia. Syringomyelia represents the chronic adult expression of the same hydrodynamic stresses that produce myelomeningocele in intra-uterine life. The associated skeletal changes probably are secondary to distortion of the developing sclerotomes produced by increased pressure within the neural tube due to atresia. Occult spina bifida is due to dysraphia of the developing sclerotome, and bears no causal relationship to meningocele

The Theory

The purpose of this study is to advance the hypothesis that the Arnold Chiari malformation, like the Dandy Walker syndrome is due to embryonal atresia of the fourth ventricle that the myelomeningocele of the former and the bulging occiput of the latter originate as diverticula of the neural tube produced in the embryo by the pressure of the obstructive hydrocephalus that the adult counterpart of myelomeningocele is syringomyelia

The Embryology

A study of the embryologic development of the cerebro spinal fluid spaces throws light on the pathogenesis of these malformations In the embryo the central canal of the spinal cord communicates with the ventricular system together they constitute the neural tube During the sixth week of embryonal life with the development of the choroid plexus, the ventricular fluid begins to pass through the permeable rhombic roof and to distend the developing subarachnoid space By the end of the eighth week the subarachnoid space is completely developed The ventricular fluid continues to gain access to the subarachnoid space by diffusion through the rhombic roof until the foramens open at the fifth month

The Hydrodynamics

The sixth to the eighth week of embryonic life therefore constitutes a critical period in the development of the cerebrospinal fluid spaces If the rhombic roof at this age is not adequately permeable the ventricular fluid will not escape in sufficient quantity to expand properly the subarachnoid space Communicating hydrocephalus will result

Mounting pressure within the neural tube at this time may cause a diverticulum of the tube This may be compared

to the bulging of an inner tube when its elastic resistance suddenly is overcome by the inflating pressure If this bulging occurs at the caudal end of the neural tube a myelomeningocele with Arnold Chiari malformation is the result If it occurs at the cephalic end the Dandy Walker syndrome results

If the mounting pressure within the neural tube reaches its peak after the spinal subarachnoid space has developed a localized bulging of this space may result This will occur at the weakest part which usually is in the caudal region This constitutes a simple meningocele

If the membranes enclosing the outlets of the fourth ventricle persist but are freely permeable the intracranial pressure will be normal The confined ventricular fluid pulse wave, however will be funneled into the upper end of the central canal causing it to remain patent and resulting in a gradual dilatation (hydromyelia or syringomyelia) at some lower level of lesser resistance

If the foramen of Magendie opens normally the pulse wave of the ventricular fluid escapes through the patent foramen into the subarachnoid space Here its force is expended on the outer surface of the spinal cord with the result that the central canal undergoes a process of coaptation and fusion to become a vestigial structure

The Application

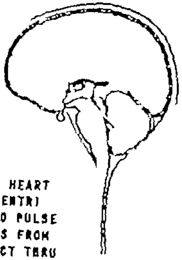
The surgical treatment of the patient with symptoms of syringomyelia therefore consists in re establishing the patency of the foramen of Magendie This will divert the ventricular fluid pulse wave into the spinal subarachnoid space where its force will be expended on the outer surface of the cord as nature intended

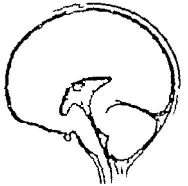
NORMAL

ADULT

COMMUNICATING HYDROCEPHALUS
WITH MENINGOCELE

INFANT





WITH EACH HEART BEAT THE VENTRI CULAR FLUID PULSE WAVE SPURTS FROM THE AQUEDUCT THRU THE FORAMEN OF MA GENDIE INTO THE SUBARACHNOID SPACE WERE IT TENDS TO COMPRESS THE CORD FROM WITHOUT AND THUS TO OBLITERATE THE CENTRAL CANAL OF THE CORD





THE FORAMEN OF MAGENDIE AT THE LOWER END OF THE FOURTH VENTRI CLE IS BOUNDED BY THE CEREBEL- LAR TONSILS AND THE VERMIS

SIMPLE MENINGO- CELE IS A BULGING DIVERTICULUM OF THE SUBARACHNOID SPACE OCCURRING DURING OR AFTER THE 8 TH WEEK OF EMBRYONIC LIFE, THE RESULT OF COM MUNICATING HYDRO CEPHALUS

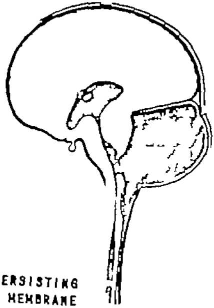




INFANT WITH MENINGOCELE

DANDY WALKER

INFANT



IF THE PERSISTING EMBRYONIC MEMBRANE OCCLUDING THE FOR AMEN OF MAGENDIE IS IMPERMEABLE BUT ELASTIC IT WILL BULGE TO FORM A HUGE DIVERTICULUM OF THE NEURAL TUBE ASSOCIATED WITH HY DROCEPHALUS





IN THIS CONDITION THE BULGING OCCIPUT WILL TRANSMIT LIGHT AS SHOWN IN THE PHOTOGRAPH

DANDY WALKER

(SYRINGOMYELIA)

ADULT



IF THE PERSIST ING EMBRYONIC MEMBRANE OCCLUD ING THE FORAMEN OF MAGENDIE IS ELASTIC AND PER- MEABLE IT WILL BULGE LESS AND HYDROCEPHALUS WILL BE MILD OR ABSENT HYDROMY- ELIA HOWEVER WILL PROGRESS OVER THE YEARS





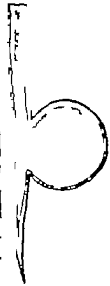
DANDY WALKER DEFORMITY WITH SYRINGOMYELIA EXPOSED AT OP ERATION

ARNOLD CHIARI

INFANT



IF THE EMBRYONIC
MEMBRANE IS PERM
EABLE AND INELAST-
IC HYDROCEPHALUS
AND HINDBRAIN HER
NIATION WILL BE
MILD AND MYELOMEN-
INGOCELE ABSENT
HYDROMYELIA HOW
EVER WILL PROGRESS
GRADUALLY OVER THE
YEARS

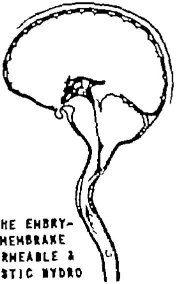




INFANT WITH MYELOMENINGOCELE

ARNOLD CHIARI
(SYRINGOMYELIA)

ADULT



IF THE EMBRY-
ONIC MEMBRANE
IS PERMEABLE &
INELASTIC HYDRO
CEPHALUS AND
HINDBRAIN HERN-
IATION WILL BE
MILD AND MYELO
MENINGOCELE AB
SENT HYDROMYEL
IA HOWEVER WILL
PROGRESS GRAD
UALLY OVER THE
YEARS





ARNOLD CHIARI MALFORMATION WITH
SYRINGOMYELIA EXPOSED AT OPERA-
TION

Psychopharmacology: Principles and Mechanism of Drug Action on Higher Nervous Functions, Voluntary and Autonomic.

W Horsley Gantt and Lester H Gliedman Johns Hopkins University Medical School Baltimore.

Conventional pharmacological methods are inadequate to assess drug action on behavior and psychopathology because of the confusing effect of the experimenter (Person) with drug action (placebo effect) and lack of appropriate measures of higher nervous function. Our method (1) separates experimenter from subject by injection of the drug automatically through permanently placed plastic tubes or subcutaneous needles, and (2) uses quantitative measures of learned autonomic function as well as of the voluntary muscular. Those effects conditionable are the centrally motivated but not those acting solely peripherally. Special studies of tranquilizers are demonstrated on acquired psychogenic functions such as tachycardia and blood pressure; mechanism of protection against development of psychogenic hypertension are shown, together with drugs classified according to new principles of action on higher nervous function as well as principles of a new psychopharmacology.

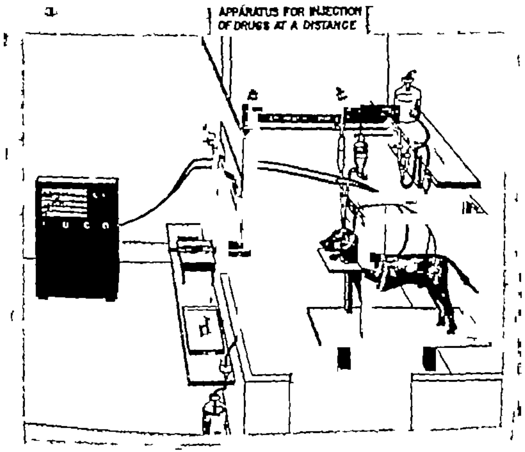


PURPOSE

The development of methods of evaluating drug action on the whole intact animal over its life span based on the conditional reflex technic of Pavlov makes possible the analysis of action of the newer drugs as well as physiological mechanisms of the nervous system This exhibit covers 20 years' work in the Pavlovian Laboratory at Johns Hopkins and includes the work of Leo Alexander Alpern Bridger Clinton Brown Dykman Finch, Finkelstein Fleck Fleischmann Freile Katzenelbogen Loucks E K Marshall Mawardi McKenzie Muncie Newton Owens Peters Rienhoff V Rosen Scott Stephens Teitelbaum Thorn Wilkins Wintrobe Wolff

METHOD

The study of drugs on higher nervous activity requires methods different from those usually employed in pharmacological studies The following rules must be observed The results should be 1) quantitatively measurable 2) mechanically recorded 3) the subject must be intact and healthy 4) extraneous factors such as novel or unusual environment and particularly the Person (experimenter) must be eliminated or controlled The exclusion of Person is desirable in all experiments with



higher nervous activity imperative where as in our experiments cardiac and visceral conditional reflexes (HR-CR) are measured

To eliminate Person we have perfected methods of injecting dogs mechanically without the presence of Person Heart rate blood pressure respiration movements salivation gastric and urinary secretions are recorded and collected mechanically without the presence of the experimenter

Orienting Reflex The study of this response is especially revealing It is the focusing of the subject on a novel stimulus and environment a questioning reaction it normally disappears when the environment is no longer novel. It is at the basis of alertness and perhaps learning It has both cardiac respiratory visceral responses and gross motor Its study is especially useful in assessing action of newer drugs

RESULTS

Using the above methods the results as described below have been obtained

General Effects

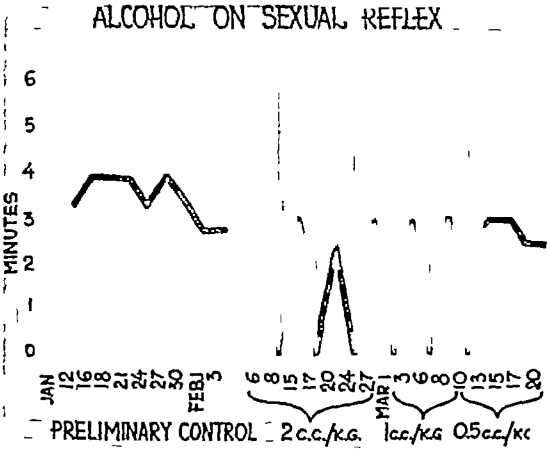
Most agents affect behavior according to a certain pattern the weaker more recently formed acquired responses (conditional reflexes) are affected first later the strong, older conditional reflexes then the weak unconditional reflexes and finally the strong and stable Besides this hierarchy of action from weak to strong, there is also selective action. Furthermore there may be 1) perversion of relationships between learned responses 2) schizokinetic and 3) autokinetic effects

Sedatives Anesthetics and Narcotics

Ether and barbiturates reduce conditional reflexes and then the unconditional reflexes demonstrating from weak to strong, the hierarchy described above In recovery the reflexes reappear in the reverse order Morphine disrupts motor but not cardiac conditional reflexes but appears to increase motor and cardiac orienting reflexes at the 2 5 mgm/kg dosage level

Alcohol

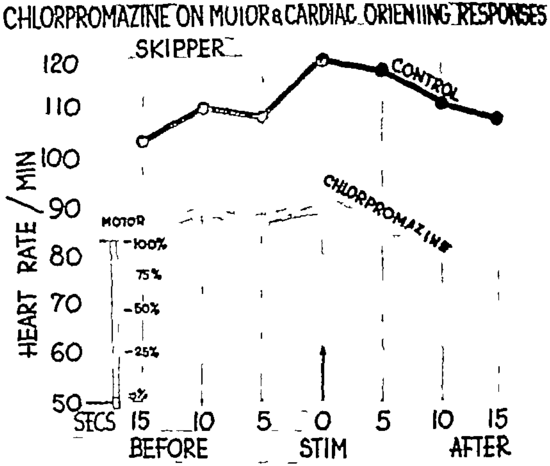
Even in doses (5 cc/kg) too small to be reflected in observable behavior the latent period is prolonged for the appearance of conditional reflexes Moderate doses (1 0 cc/kg) which may increase general muscular activity diminish intensity of conditional reflexes and may lead to paradoxical actions viz causing the weak or even inhibitory conditional reflexes to become stronger than the usually strong ones



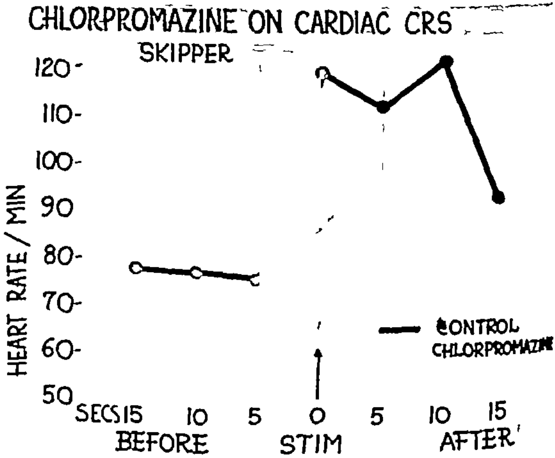
Alcohol has an interesting effect on sexual reflexes according to the type of animal In the normal and the hyperactive it diminishes or abolishes sexual reflexes (noted by Shakespeare in Macbeth) lengthens latent period and reduces sperm count However in the abnormal inhibitory type as in our catatonic dog V3 who was never capable of normal sexual erections alcohol made this possible for an unusually prolonged interval Thus alcohol may have a therapeutic effect in inhibitory humans relieving ejaculatio praecox.

Ataraxics

These have been studied for their effect on both the visceral autonomic and somatic components of learned behavior and on the orienting reflex, which is at the basis of most reactivity on a higher level Chlorpromazine and reserpine markedly diminish the cardiac as well as the motor components of the orienting reflex but have less effect upon conditional reflexes Meprobamate also reduces the cardiac component of the orienting reflex. In thus lessening the cardiac reactivity in the unlearned, alerting response these drugs may provide a state of rest for the overactive organism especially on the autonomic level Their marked reduction of the cardiac components of the orienting reflex compared to their much lesser effects on the conditional reflex, suggest their use in easing the burden on an overworked heart in hypertension.



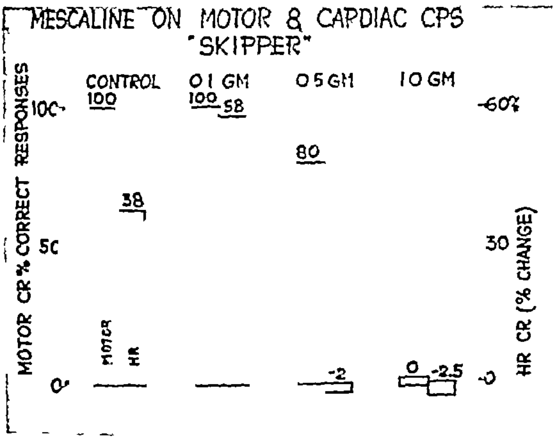
CHLORPROMAZINE ON MOTOR & CARDIAC ORIENTING RESPONSES
SKIPPER
CONTROL
CHLORPROMAZINE
HEART RATE / MIN
120
110
100
90
80
70
60
50
MOTOR
-100%
75%
-50%
-25%
0%
SECS 15 10 5 0 5 10 15
BEFORE
STIM
AFTER



CHLORPROMAZINE ON CARDIAC CRS
SKIPPER
HEART RATE / MIN
120-
110-
100-
90
80-
70-
60-
50
SECS 15 10 5 0 5 10 15
BEFORE
STIM
AFTER
CONTROL
CHLORPROMAZINE

Psychotomimetics

Mescaline has been studied for its effects on visceral (cardiac) and motor conditional reflexes It is one of the few drugs having a relatively greater inhibitory effect on cardiac conditional reflexes

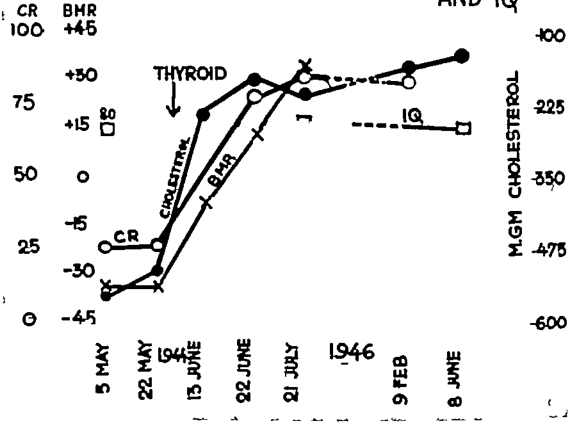


Hormones, vitamins

Thyroid deficiency markedly impairs conditional reflex formation in patients though it may not reduce retention of learned responses Thyroid therapy can restore conditional reflex function

Some B vitamins when deficient for only 3 5 days may impair learning ability and differentiation long before any neurologic or metabolic changes are detectable The impairment is quickly relieved by restoring the deficient vitamin to the diet The loss of function is comparable to that seen after anoxia (4 hours exposure to 20 000 or 25 000 feet) but the latter may be irreversible

EFFECT THYROID THERAPY ON CR, BMR, CHOLESTEROL, AND IQ



Other Drugs

Sulfanilamide has a more pronounced impairing effect on visual conditional reflexes than on those involving the auditory modality

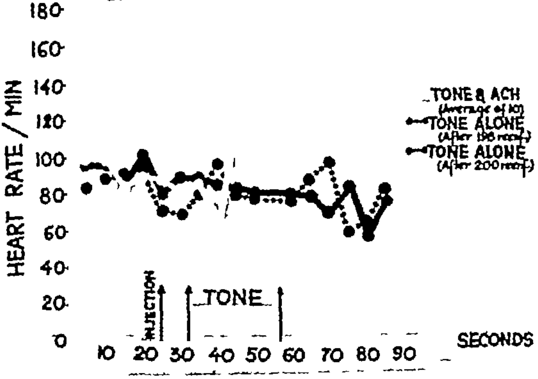
Convulsions

When produced by metrazol or electric shock convulsions may like the above anoxia abolish conditional reflex function for a year or more Square wave electroshock therapy has a markedly less disturbing effect on behavior

Mechanism of Conditional Reflex Formation to Drugs

Drugs have been used to reveal the mechanism of the principles underlying conditional reflex formation Those drugs which produce their effect by peripheral action either on peripheral nerve endings or other peripheral structures outside the central nervous system cannot be conditioned eg pilocarpine prostatic and salivary secretion histamin gastric secretion adrenalin hyperglycemia ACh or atropine effect on heart rate cannot be conditioned because these particular effects are produced by the peripheral action of the drug But the effects of drugs mediated through the central nervous system eg morphine sleep and apomorphine vomiting, can be conditioned

ACH EFFECT ON HEART RATE CANNOT BE CONDITIONED
BECAUSE PERIPHERALLY PRODUCED

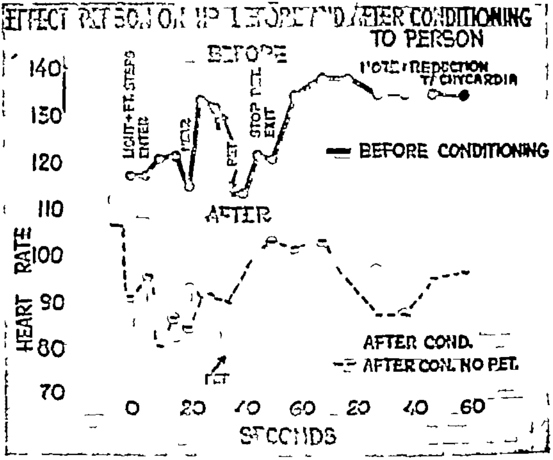


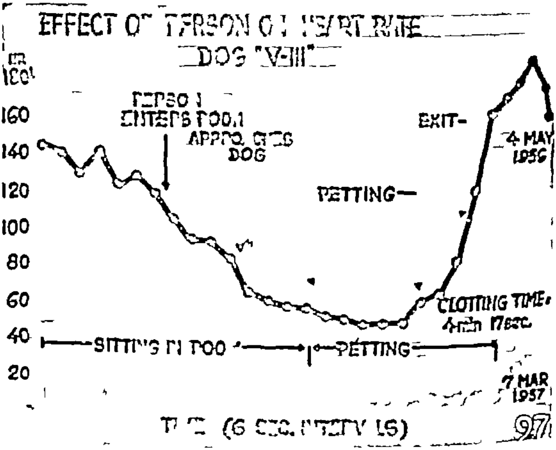
Fractional Conditioning

The effects of drugs mediated centrally can be conditioned while those mediated through peripheral action reveal a principle of fractional or partial conditioning to drugs Thus the trembling of adrenalin injection can be conditioned (central) but not the hyperglycemia (peripheral)

Placebo Action

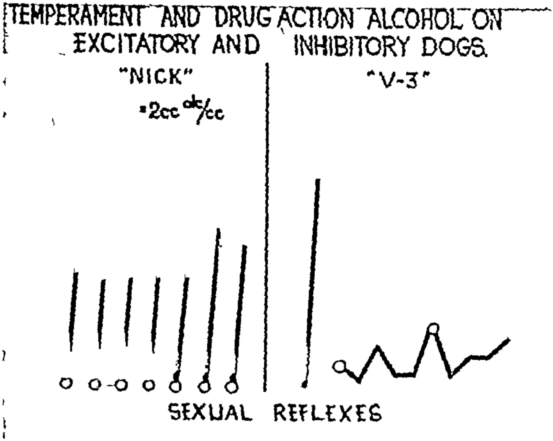
This may be explainable through the formation of a conditional reflex to Person based on the drug effect or perhaps the effect of Person independent of the drug that may either mask or be confused with the drug effect. Because the experimenter is not ordinarily separated from the subject the effect of Person and drug are frequently not differentiated


TO PERSON
BEFORE CONDITIONING
AFTER COND.
AFTER CONI. NO PET.
HEART RATE
140
130
120
110
100
90
80
70
0
20
60
20
40
60


DOG
160
140
120
100
80
60
40
20
EXIT-
PETTING—
CLOTTING TIME
7 MAR
1957
97

Effect of Temperament

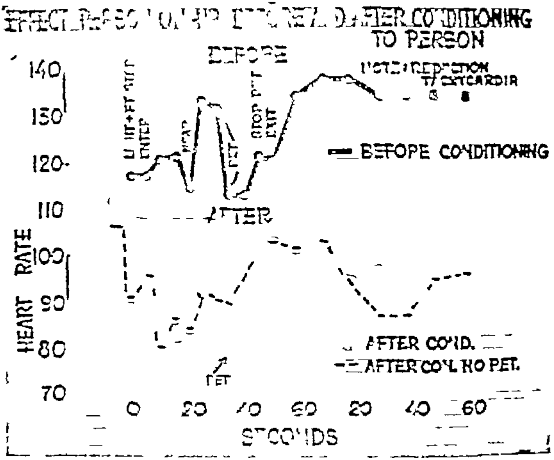
As shown by the opposite effect of alcohol on the sexual reflexes and behavior in excitatory (Nick) and inhibitory dogs (V3) the type of indivi dual should be taken into account in both dosage and determination of effect.

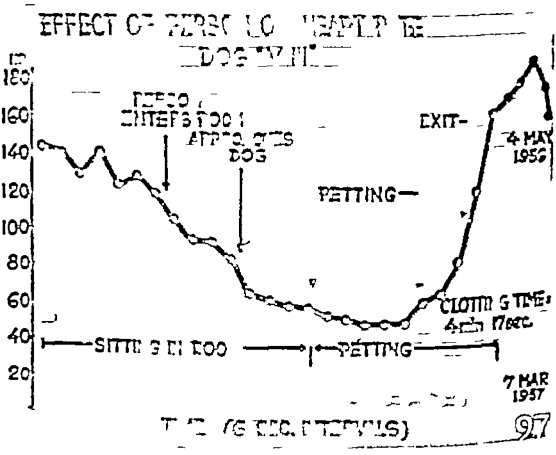


Schizokinesis and Autokinesis

Ordinarily the visceral emotional components of behavior are much more stable and persistent than the more observable somatic motor aspects of behavior This greater sensitivity on the one hand and greater stability on the other hand of cardiac responses (schizokinesis) may be one basis for pathology eg psychoses and hypertension. Drugs have a varied effect on visceral or somatic learning, thus the new ataraxics reduce both the visceral and the motor components of orienting response (morphine the motor conditional reflexes mescaline the cardiac conditional reflexes to a greater degree)

We have often noted that a short therapeutic process may produce effects out of proportion to the duration of the therapy Internal developments may occur within the organism on the basis of stimulations plus


TO PERSON
BEFORE CONDITIONING
AFTER COND.
HEART RATE
140
130
120
110
100
90
80
70
0
20
60
20
60


EFFECT
180
160
140
120
100
80
60
40
20
DOG
EXIT
4 MAY
PETTING
PETTING
7 MAR
1957

97

Selected Bibliography

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Gliedman, Lester H and W Horsley Gantt Effects of Reserpine and Chlorpromazine on Orienting Behavior and Retention of Conditional Reflexes Sou Med J 49 8 1956

Gliedman Lester H W Horsley Gantt and Harry A. Teitelbaum Some Implications of Conditional Reflex Studies for Placebo Research. Am Psychia. Assoc (in press)

Stephens Joseph and W Horsley Gantt Morphine on Acquired Behavior and Inborn Reflexes Measured by Cardiac and Motor Responses Bull. Johns Hopkins Hosp 98 245 1956

Teitelbaum Harry A. and W Horsley Gantt Method of Intravenous Injection of Drugs from a Distance in Conditional Reflex Studies Science, 113 2943 May 25 1951

Honorable Mention

NERVOUS AND MENTAL DISEASES

Putting Psychiatry Back Into Medicine. Frank J Ayd Jr., Franklin Square Hospital Baltimore.

This exhibit discusses the admission of psychiatric patients to general hospitals. It points out that recent advances in treatment especially the development of the tranquilizing drugs makes it possible to treat a greater number of psychiatric patients in a general hospital. This is illustrated by outlining the experience at Franklin Square Hospital in the past three years. The exhibit covers: (1) types of patients; (2) types of treatment; (3) duration of stay and (4) advantages to patient doctor hospital and community



At present general hospitals in this country accommodate less than 1% of the mentally ill

However mental patients should be accepted for admission to general hospitals.



[illegible]





[illegible]

ADVANTAGES

No stigma

Patient and family more likely to accept admission to general hospital

Contact with family and friends maintained—patient does not feel put away

Early treatment of illness—better prognosis

Economical

Continuous contact with family physician possible

WHAT IT TAKES TO INITIATE THIS PROGRAM

Recognition of the need

Staff psychiatrist

Hospital staff cooperation

THE FRANKLIN SQUARE STORY

This general hospital without a special psychiatric unit admits psychiatric patients to private, semi-private and ward beds. They are not isolated from medical and surgical patients.

FRANKLIN SQUARE HOSPITAL

ADMISSIONS

1 Until August 1 1955 – No psychiatric patients admitted
2 August 1 1955 to December 31 1955 – 26 patients admitted
3 1956 – 100 patients admitted

DIAGNOSIS

1 Acute brain syndromes – alcoholism – toxic psychosis
2 Psychoneurotic disorders
3 Schizophrenic reactions
4 Manic-depressive reactions — Quiet or Disturbed
5 Acute psychic disturbances in geriatric patients

TREATMENT

1 Drug therapy: reserpine (SERPASIL); chlorpromazine (THORAZINE)
2 Electroconvulsive therapy
3 Psychotherapy

DURATION OF STAY:

MINIMUM	AVERAGE	MAXIMUM
3 days	14 days	33 days

Only one general hospital in Baltimore accepted mental patients prior to 1953
Now all general hospitals in this area accept psychiatric patients.

NEED FOR PROGRAM IN YOUR AREA

GENERAL HOSPITALS ACCEPTING MENTAL PATIENTS

[illegible]

ESTIMATED TOTAL NUMBER OF PSYCHIATRISTS IN U. S. (May 1956)*

9 295

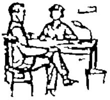
Administrative—6,197
Practicing—3,098

ESTIMATED NUMBER OF MENTAL PATIENTS INCLUDING CHILDREN

12 000 000

ADVANTAGES OF THIS PROGRAM TO

PATIENT





DOCTOR

Medical and surgical consultation readily available.

Improved working relations with referring physician.

Better rapport with family

HOSPITAL

Interns residents and nurses learn basic psychiatric principles and treatment techniques.

Opportunity for general medical staff to learn the importance of emotional factors in all types of illnesses.

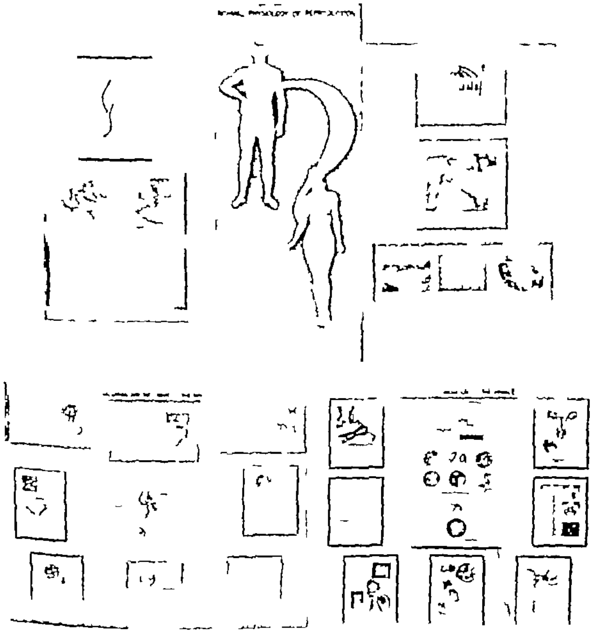
No addition to existing staff

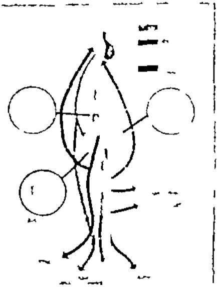
COMMUNITY

More realistic understanding and acceptance of psychiatric disorders.

Infertility: Diagnosis and Treatment. Robert B Greenblatt Joan Landry Edwin C. Jungck, and William E. Barfield Medical College of Georgia Augusta, Ga.

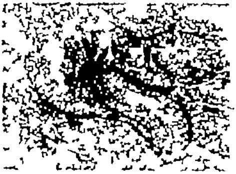
The normal physiology of reproduction is outlined the procedures utilized for diagnosis of abnormalities are pictured, and the methods of treatment of these abnormalities are described The e hibit has been divided into female and male portions.





Normal Pituitary Testicular Axis

TESTICULAR BIOPSY



Normal Testis Low Power



Normal Testis—High Power



Normal Sperm Low Power

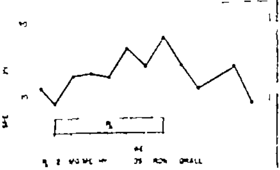


Normal Sperm—High Power



Technique of testicular biopsy

E FECT OF TRE T ENT ON SPE M COUNT
(Les than suppressive dose of estosterone)

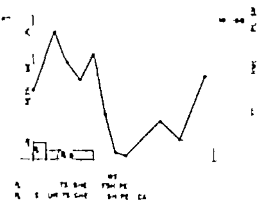


SMALL AMOUNTS OF TE TOSTERONE ARE FOUND TO BE MODERATEL STI ULATORY



Testicular biopsy before treatment

EF C GON T PHINS N SPERM COUNT





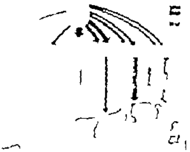
Testicular biopsy before treatment

E FECT OF T E TMENT ON SPER COUNT
(Testosterone suppres and rebound)

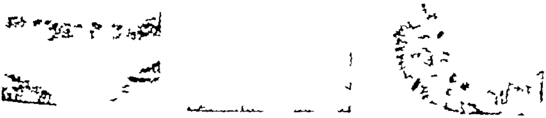




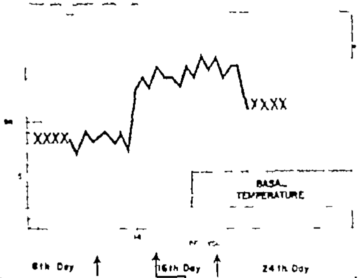
Testicular biopsy before treatment

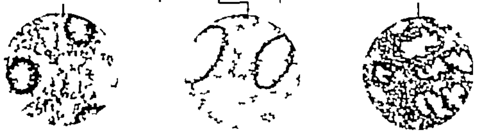






BIPHASIC OVULATORY BASAL TEM E A URE RECORD





A Follicular phas B Pres tory phase C Proges ional (secretory)



D Atrophic endometrium E Cystic glandular hyperplasia F Imperf ct progestational (m ed) endometr um





Suction urettage performed at onset of anovulatory bleed ng

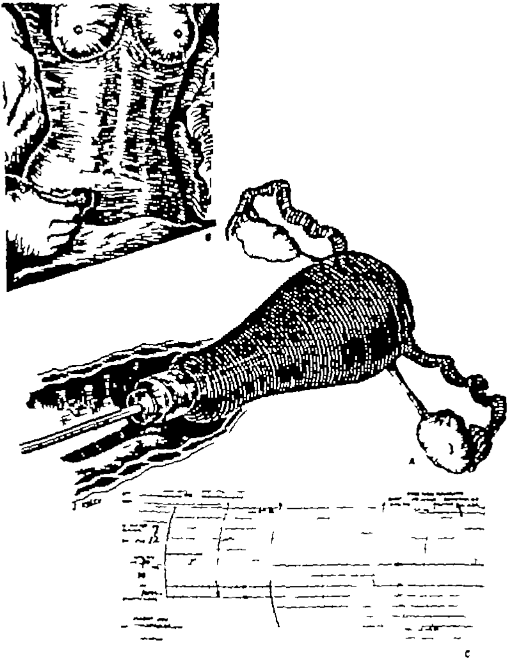
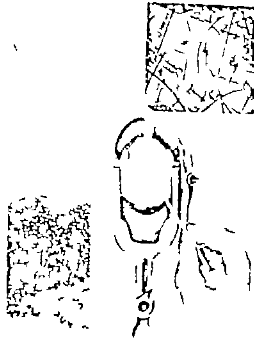


Fig 6

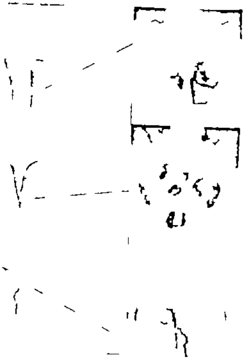
RUBIN TEST

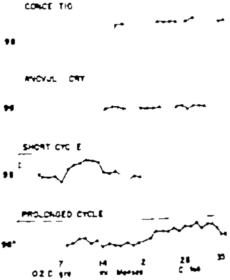
Uterotubal insufflation with CO_2 Note peristaltic waves in lower graph indicating normal tubal patency



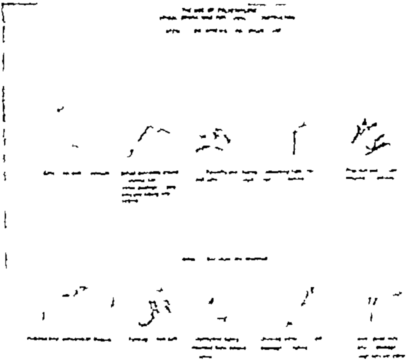


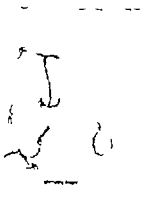
A Fern phenomenon indicates adequate estrogens present
B Loss of ferning post ovulatory or pregnancy
C Reappearance of ferning early pregnancy may indicate impending abortion.

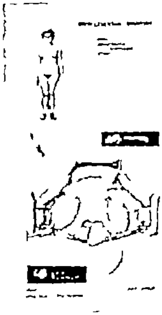




SURGICAL PROCEDURES TO AID FERTILITY





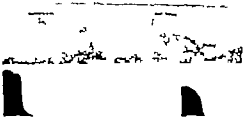




FUNCTIONAL UTERINE BLEEDING



[illegible] daily administration of adequate doses of progesterone (25–50 mg) or progesterone [illegible] estrogen and/or testosterone [illegible] arrest bleeding and induce medical curettage. Ovulatory menses will frequently follow.



[illegible] is administered intramuscularly every [illegible] until bleeding arrested. Then oral estrogens [illegible] decreasing doses are given for [illegible] days followed by oral progestins to induce medical curettage. Ovulatory menses will frequently follow.

FUNCTIONAL AMENORRHEA

The following methods may be tried to induce ovulatory menstruation

	Method	Result
1	X Radiation to ovaries	good in selected cases
2	Wedge resection of ovaries	good in selected cases
3	Cortisone therapy	good in adrenal dysfunction cases
4	Estrogen therapy (to stimulate L.H. secretion)	occasionally successful
5	Progesterone therapy (to stimulate FSH secretion)	occasionally successful
6	Cyclic estrogen and progesterone therapy	occasionally successful
7	Thyroid medication (to stimulate metabolic function)	occasionally successful
8	Gonadotropin therapy (cyclic PMS and APL)	very poor results

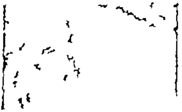
MEMBRANOUS DYSMENORRHEA



Decidual Cast

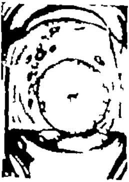
TREATMENT

Androgen therapy [illegible] doses of 75 mg [illegible] subcutaneously of 2 or 3, 75 mg [illegible] of testosterone [illegible] cast formation and [illegible] frequently follows.



Histologic section showing hyperprogestational (decidual) endometrium.

ENDOMETRIOSIS



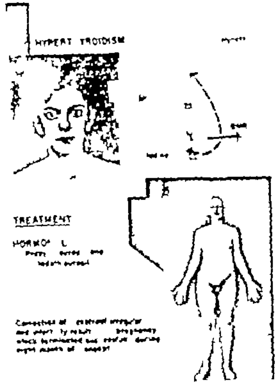
Endometriosis of cervix and vaginal vault

TREATMENT

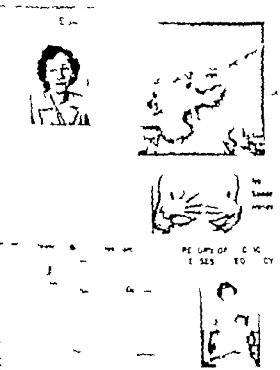
Androgens may be employed to modify endometriosis. [illegible] dosages of 75 mg of testosterone [illegible] or three pellets of testosterone are implanted, [illegible] may follow the clinical improvement.

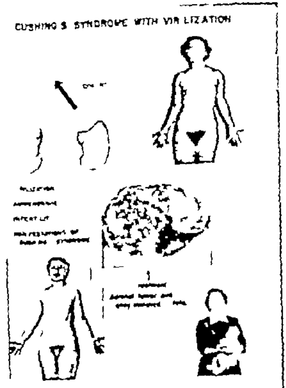


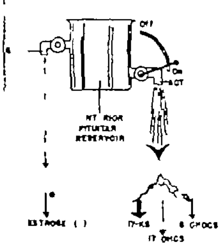
Histologic section showing cervical endometriosis



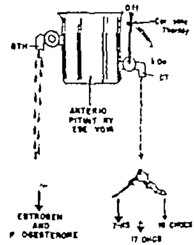
Improvement in thyrotoxicosis with antithyroid drugs was followed by conception.







Administration of cortisone to patients with subclinical adrenogenitalism as well as those with congenital adrenal hyperplasia results in suppression of corticotropin (ACTH) output and in reduction of 17 ketosteroids. With the plugging of the anterior pituitary reservoir balanced gonadotropic hormone (GTH) product becomes possible with subsequent function of the ovaries to ovulation.

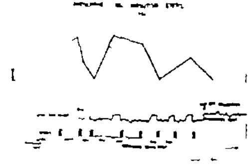


EFFECT OF CORTISONE THERAPY ON OVARIAN FUNCTION AND INCIDENCE OF CONCEPTIONS

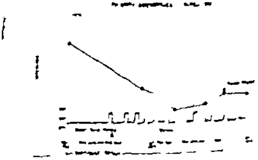
No. patients	Unsatisfactory result	Increased ovulatory response	No. patients who became pregnant during or after cortisone	No. patients who became pregnant after wedge resection following cortisone failure	Total no. pregnancies
[illegible]	[illegible]	23	[illegible]	[illegible]	[illegible]

Includes 4 abortions; 2 patients who aborted had subsequent successful pregnancies. (From Greenblatt et al.: Fertility and Sterility, 1956.)

SUBCLINICAL ADRENOGENITALISM



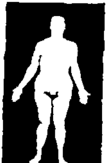
SUBCLINICAL ADRENOGENITALISM





Cortisone therapy modified pituitary function in this patient ... ovulatory ... resulting ... for menses and conception.





Cortisone therapy reduced 17 ketosteroid excretion followed by ovulatory menses and conception (patient now seven months pregnant).

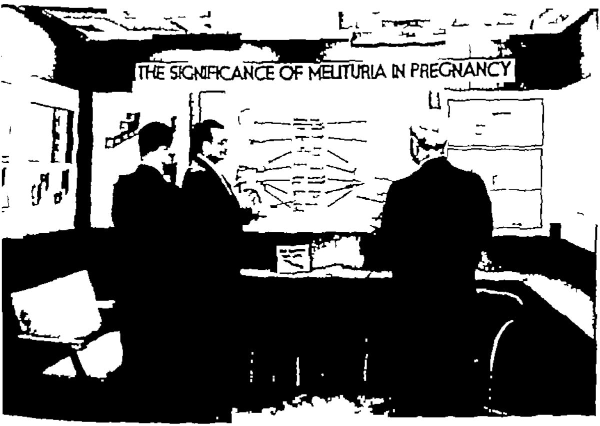


Honorable Mention

OBSTETRICS AND GYNECOLOGY

The Significance of Mellituria in Pregnancy Milton Gross, Robert E. Sexton, and Robert I. Dorian Margaret Hague Maternity Hospital Jersey City N. J.

Periodic urine examinations were made in over 800 normal pregnant out patients for reducing substances, (Benedict's urine sugar test), glucose (glucose oxidase testpapers) and ketones (Rothera test). The physiology of mellituria in pregnancy is presented diagrammatically. This mellituria has been regarded as common, usually benign, and probably due either to lactose or to a reduction in the apparent renal threshold for glucose. Clinical and laboratory evidence is provided in charts and graphs which suggests that frequently true glycosuria in otherwise symptom-free pregnant women may be indicative of an underlying defect in carbohydrate metabolism exposed by the strain of pregnancy. A higher incidence was found in women with true glycosuria of such factors generally associated with diabetes mellitus as obesity, ketonuria, abnormal parturition, increased fetal size and fetal wastage. Consequently periodic examination for true glycosuria should be routine procedure during the prenatal period.



PHYSIOLOGICAL FACTORS WHICH CONTRIBUTE TO OCCURRENCE OF MELITURIA IN NORMAL PREGNANCY

A. Hormonal factors are glucogenic and may induce glycosuria
   1. *Increased adrenocorticotropic hormone*
   2. *Increased growth hormone*
   3. *Increased thyroid hormone*
   4. *Increased adrenal glucocorticoids*

B. Increased alimentary uptake of carbohydrate during pregnancy may result in post-prandial hyperglycemia with glycosuria Sugars other than glucose are also absorbed and eliminated more rapidly during pregnancy, to give a higher incidence of non-glucose melituria (Positive copper reduction tests negative "Tes Tape")

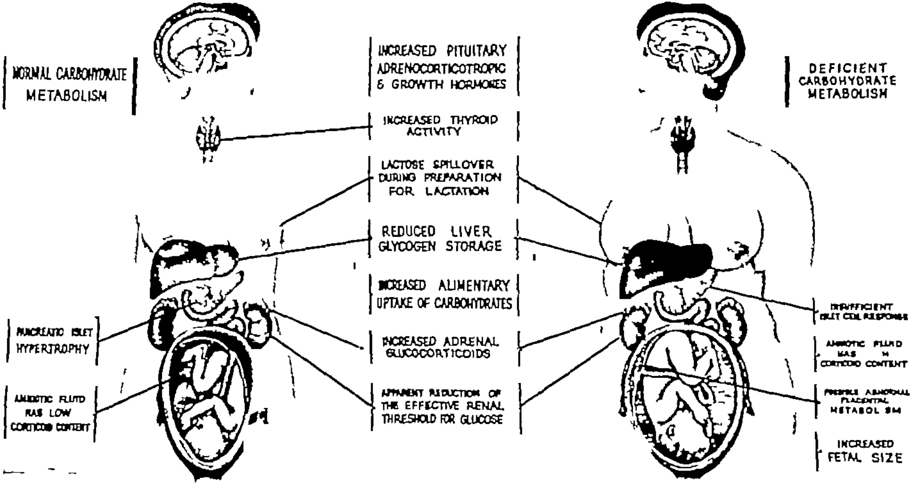
C. Urine sugar may be lactose spill over during preparation for lactation (Positive Copper reduction tests Negative "Tes Tape")

D. Liver has reduced capacity for storing glycogen

E. The apparent effective renal threshold for glucose may be reduced This may also be a consequence of the increased rate of glomerular filtration

F. In normal pregnancy there is hypertrophy of the pancreatic islet tissue to supply increased demand for insulin and to counterbalance anti-insulin hormones If the patient has an inherently less effective pancreas it may not be capable of meeting the requirements imposed by the gestation.

'ORIGIN OF 'MELITURIA' IN 'PREGNANCY'



-Periodic urine examinations were made in 921 NORMAL pregnant outpatients of the MARGARET HAGUE MATERNITY HOSPITAL CLINIC *REDUCING SUBSTANCES* (Benedicts Urine Sugar Test) *GLUCOSE* (Glucose Oxidase Test Paper) and *KETONES* (Rothera Test) were determined in fasting and post breakfast specimens

In approximately half of the urines which gave a positive BENEDICTS REACTION this was due to TRUE GLYCOSURIA (positive TES TAPE)

Melituria of pregnancy has been regarded as COMMON usually benign and probably due either to lactose or to a reduction in the apparent renal threshold for glucose Glycosuria may be a normal concomitant of the physiologic changes occuring during pregnancy Never the less THE GLYCOSURIA OF PREGNANCY IS NOT ALWAYS BENIGN

It may be the first indication of a defective carbo hydrate metabolism bending under the strain exacted by the superimposition of an active protoplasmic mass which is predominantly anabolic and which requires the carbohydrate energy producing mechanism to operate at peak efficiency A pancreas inherently possessed of reduced potential may not be capable of responding to the requirements of this additional load Homeostatic endocrine systems may not be able to adjust with sufficient rapidity The necessary reorganization of hepatic biochemistry may not occur resulting in the contribution of a deficient supply of intermediary metabolites and energy transformations

TESTS FOR DIFFERENTATION OF MELITURIA (URINE SUGAR)

1 MICROBIOLOGICAL (FERMENTATION)
2 IDENTIFICATION OF OSAZONE
3 SPECIFIC CHEMICAL TESTS
4 PAPER CHROMATOGRAPHY
5 SPECIFIC ENZYME TESTS

GLUCOSE OXIDASE TEST PAPER SPECIFIC FOR GLUCOSE

GLUCOSE + O_2 → GLUCONIC ACID + H_2O

H O + O-TOLIDINE → COLOR

INCIDENCE OF POSITIVE TESTS IN RELATION TO DURATION OF PREGNANCY

WEEKS		UNDER 24 %	24 28 %	29 33 %	34-38 %	OVER 38 %	1 5 DAYS POST PARTUM %
BENEDICTS URINE SUGAR	A	7 4	13 5	13.8	13 0	8.2	15 5
	B	12 5	12 1	12 0	14.5	9 8	
TES TAPE GLUCOSE OXIDASE TEST PAPER	A	2 3	6.8	7 9	5.5	4.0	8 4
	B	6 9	5 1	7 5	8 6	4 3	
KETONURIA ROTHERA TEST	A	3.5	5 1	8 2	8 0	3 6	29 6
	B	2 3	5 0	4 7	3 6	2 2	

Ⓐ FASTING URINE BROUGHT IN FROM HOME Ⓑ AFTER BREAKFAST URINE COLLECTED AT HOSPITAL

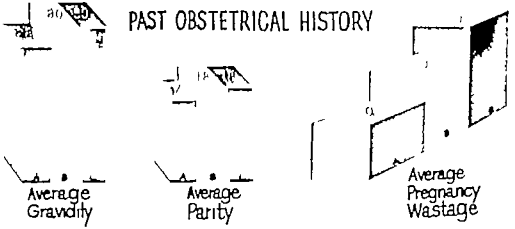
DISTRIBUTION OF POSITIVE REACTIONS

GLUCOSE (gms %)	TRACE	0 1	0 25	0 5	1 0	1 5	2 0	TOTAL REACTN
BENEDICTS		TR 10 6	+	++ 1 5	+++ 0 2		++++	12.3%
TES TAPE	1 8	+ 2 9	++ 0 9	+++ 0 7			+++ 0 2	6 5%
CLINISTIX								6 5%

TOTAL NO PATIENTS 921 TOTAL NO URINES 3552

IS PREGNANCY WASTAGE INCREASED IN WOMEN WITH TRUE GLYCOSURIA?

PAST OBSTETRICAL HISTORY

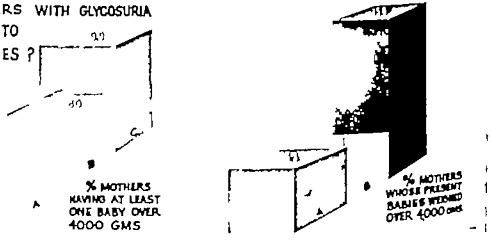


[A] *NEGATIVE BENEDICTS NEGATIVE TES TAPE (NEGATIVE URINE TEST)*

[B] *POSITIVE BENEDICTS NEGATIVE TES TAPE (Non glucose reducing substances)*

[C] *POSITIVE BENEDICTS POSITIVE TES TAPE (TRUE GLYCOSURIA)*

DO MOTHERS WITH GLYCOSURIA GIVE BIRTH TO LARGE BABIES?

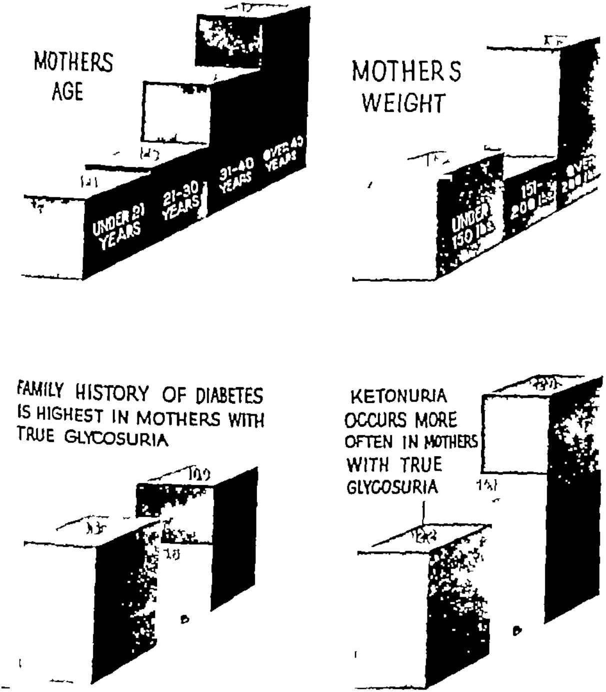


[A] *NEGATIVE BENEDICTS NEGATIVE TES TAPE (NEGATIVE URINE TEST)*

[B] *POSITIVE BENEDICTS NEGATIVE TES TAPE (Non glucose reducing substances)*

[C] *POSITIVE BENEDICTS POSITIVE TES TAPE (TRUE GLYCOSURIA)*

INCIDENCE OF TRUE GLYCOSURIA INCREASES WITH MOTHERS AGE & WEIGHT



■ NEGATIVE BENEDICTS NEGATIVE TES TAPE (NEGATIVE URINE TEST)

▣ POSITIVE BENEDICTS NEGATIVE TES TAPE (Non glucose reducing substances)

■ POSITIVE BENEDICTS POSITIVE TES TAPE (TRUE GLYCOSURIA)

PREGNANCY IS A DIABETOGENIC EXPERIENCE & MAY BE THE PERIOD FOR FIRST DETECTING THE POTENTIAL DIABETIC

The pregnant women in this study are symptom free in so far as the usual outward manifestations of clinical diabetes are concerned Nevertheless factors commonly associated with the pregnant diabetic such as

OBESITY INCREASED FETAL WEIGHT ABNORMAL PARTURITION FAMILY HISTORY OF DIABETES FETAL WASTAGE	occur more frequently in the group of mothers with TRUE GLYCOSURIA

It is not possible to say how many of these women are potential diabetics or how many will develop actual clinical diabetes However it is conceivable that deranged carbohydrate metabolism may be the basis for some of the obstetrical difficulties encountered

CONSEQUENTLY

PERIODIC URINE EXAMINATION FOR TRUE GLYCOSURIA SHOULD BE ROUTINE PROCEDURE DURING THE PRE-NATAL PERIOD __

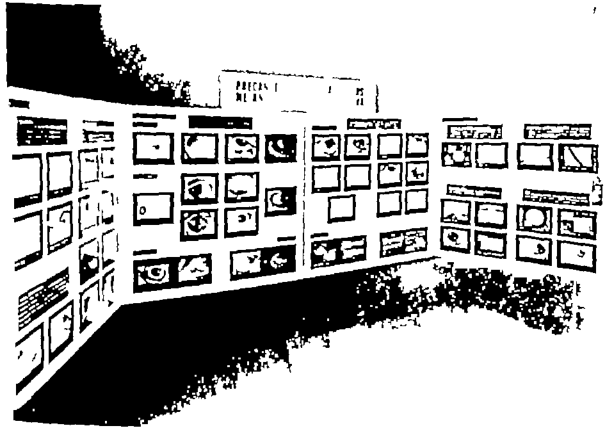
THIS TESTING IS NOW FACILITATED BY GLUCOSE SPECIFIC TEST PAPERS WHICH HAVE PROVED CONVENIENT FOR THE DIFFERENTIATION OF GLUCOSE FROM OTHER REDUCING SUBSTANCES OFTEN FOUND PRESENT IN THE URINE OF PREGNANT WOMEN

Certificate of Merit

OPHTHALMOLOGY

Precancerous and Cancerous Melanosis of the Conjunctiva. Algernon B Reese and Bradley R. Straatsma Institute of Ophthalmology of the Presby terian Hospital and Columbia Uni ersity College of Physicians and Sur geons New York.

This exhibit illustrates the histopathology and clinical characteristics of precancerous and cancerous melanosis of the conjunctiva Clinical fea tures helpful in establishing the diagnosis of this condition are illustrated and the variable often protracted cl nical course is portrayed Considera tion is given to the difficult problems of treatment and differential diagnosis.



PRECANCEROUS

BASAL CELLS OF THE CONJUNCTIVAL EPITHELIUM BECOME [illegible] AND MAY SEGREGATE INTO [illegible] CELLS ARE CARRIED TO THE FREE SURFACE OF THE [illegible]



[illegible]



[illegible]

ACTIVE PRECANCEROUS

[illegible] CELLS AND CELL CLUSTERS EXTEND TOWARD THE SUPERFICIAL SURFACE OF THE EPITHELIUM AND DEMONSTRATE [illegible] ANAPLASIA [illegible] SUBEPITHELIAL [illegible] FILTRATION WITH PIGMENT PHAGOCYTOSIS MAY DEVELOP AT THIS STAGE.



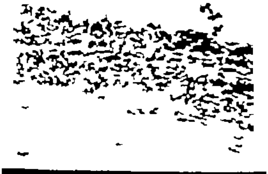
CELL CLUSTERS EXTEND TOWARD THE FREE SURFACE.



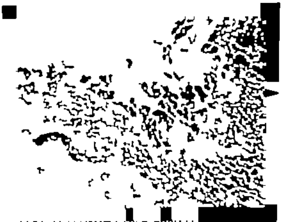
THE HYP[illegible] PLASIA

[illegible]

[illegible] CELLS REACH THE FREE SURFACE OF THE EPITHE- [illegible] THE SU[illegible] TISSUE. METASTATIC [illegible] EGI[illegible] [illegible] ICS [illegible] REMOTE ORGANS [illegible] STRATES THE [illegible] OF THE [illegible] ESS.



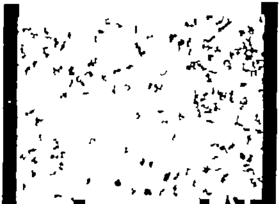
[illegible]



[illegible]



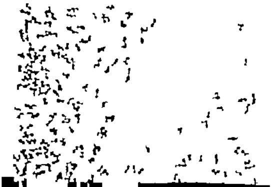
[illegible] MALIGNANT



[illegible]



[illegible]



[illegible]

CLINICAL RECOGNITION

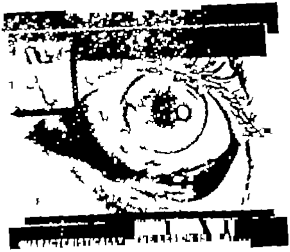
PRECANCEROUS AND CANCEROUS MELANOSIS
DEVELOP IN MIDDLE LIFE AS AN ASYMPTOMATIC UNILATERAL PIGMENTATION THAT IS...

PIGMENTED





FLAT



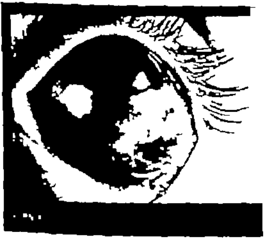


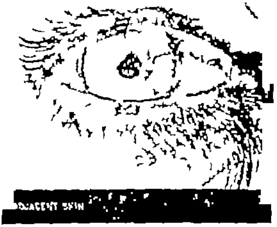
DIFFUSE





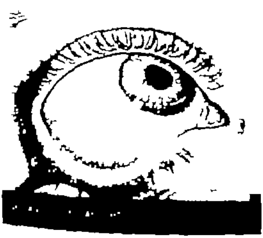
PALPEBRAL

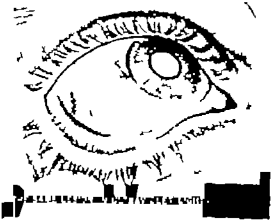




ADJACENT SKIN

FLUORESCENT



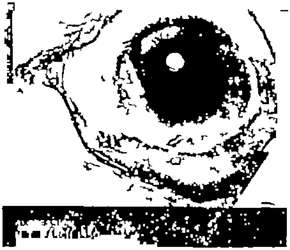


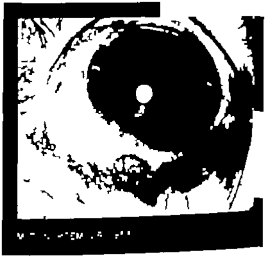
CLINICAL COURSE

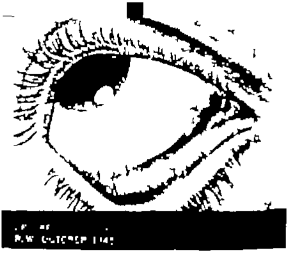
VARIABLE... [illegible] TIONS.

PRECANCEROUS → [illegible]

REGRESSION [illegible]











DIFFERENTIAL DIAGNOSIS

CONGENITAL MELANOSIS — EPITHELIAL TYPE

[illegible] IS LOCATED IN THE CONJUNCTIVAL EPITHELIUM AND IS USUALLY MOST [illegible] NEAR THE LIMBUS. PRESENT IN [illegible] OF THE [illegible]. THIS TYPE IS NOT RELATED TO GENERAL [illegible]



[illegible] PIGMENT IS HEAVIEST IN THE BASAL CELLS.



[illegible] PIGMENT MAY SHOW IRREGULAR [illegible]

CONGENITAL MELANOSIS — STROMAL TYPE

CONGENITAL [illegible] ED IN THE SUBEPITHELIAL [illegible] OF THE [illegible] ASSOCIATED WITH AN [illegible]



[illegible] ARE [illegible]



[illegible] MAY BE SEEN WITH [illegible]

MELANOSIS OCULI

PIGMENTATION IN AND AROUND THE EYE IS INCREASED IN THIS CONGENITAL UNILATERAL ANOMALY





NEVI

NEVI ARE CIRCUMSCRIBED, SOMEWHAT ELEVATED TUMORS COMPOSED OF CHARACTERISTIC NESTS OF ROUNDED CELLS WITH DENSE, SPARSE OR ABSENT PIGMENTATION



RELATIVELY FLAT NEVI ARE UNCOMMON



TREATMENT

PRECANCEROUS

ESTABLISH THE DIAGNOSIS BY CLINICAL APPEARANCE [illegible] OBSERVE THE CONDITION FOR EVIDENCE OF PROGRESSION

ACTIVE PRECANCEROUS

[illegible] EXCISION BIOPSY TO INCLUDE ALL [illegible] CONSIDER EXENTERATION [illegible] EXCISION BIOPSY [illegible] IS DEFINITE PROGRESSION CLINICALLY AND HISTOLOGICALLY



PROGNOSIS OF CANCEROUS MELANOSIS

	CASES	SURVIVING*	[illegible]
EXENTERATION AFTER DIAGNOSTIC BIOPSY	8	6	2
ALL OTHER FORMS OF TREATMENT	16	8	8
TOTAL	24 (100%)	14 (58%)	10 (42%)

*SURVIVING CASES DISEASE FREE FOR FIVE YEARS OR MORE

CANCEROUS

CLINICAL PROGRESSION AND BIOPSY ESTABLISH [illegible] IS NO EVIDENCE OF METASTATIC SPREAD.

THE PROGNOSIS OF CANCEROUS MELANOSIS [illegible] OF 24 HISTOLOGICALLY CONFIRMED CASES.

THE EXHIBITORS WISH TO ACKNOWLEDGE WITH APPRECIATION THE CASE MATERIAL CONTRIBUTED BY THE FOLLOWING PHYSICIANS

Dr Leonard Christensen
Dr R H Dennis
Dr A Gerald De Voe
Dr David Donaldson
Dr Edwin B Dunphy
Dr C E Jaeckle
Dr Fred A Loupps
Dr Paul T McAlpine
Dr G R Merriam, Jr
Dr M L Reeh
Dr Harold Scheie
Dr Arthur E Sherma
Dr Kenneth C [illegible]
Dr Georgiana Theobald

MEDICAL ARTIST — *E G Bethke*

PHOTOGRAPHY — *J H Lafayette*, *R W Corlin*

Certificate of Merit

OPHTHALMOLOGY

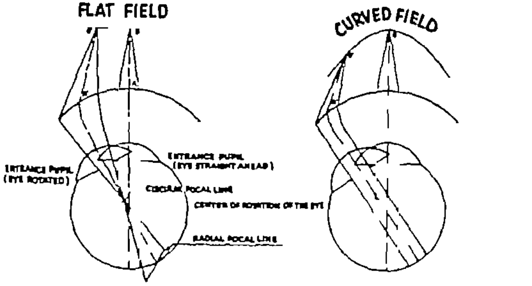
Conoid Ophthalmic Lenses: An Original Development in Subnormal Vision Aids. David Volk, Western Reserve University School of Medicine Cleveland.

The exhibit presents the results of original investigation in the designing and production of strong plus aspheric crown glass ophthalmic lenses to be used for close work by individuals with subnormal vision. The investigation revealed that the lens surfaces are prolate ellipsoids, paraboloids, and hyperboloids, hence the naming of the lenses conoid. The exhibit presents demonstration of conic sections and their application to lenses. The four main aberrations found in strong plus spheric lenses are demonstrated and the correction of each aberration with conoid lenses is shown. Conoid lenses from 15 to 100 diopters are on display. Graphs indicating some of the qualities of conoid lenses are part of the exhibit. The relationship between visual acuity and the power of the conoid lens necessary for reading is shown graphically.



CURVATURE OF FIELD

(LATERAL-OVERCORRECTION)

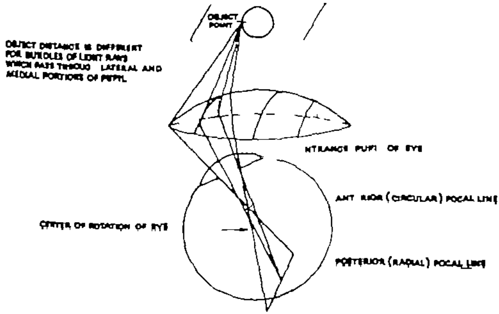


OBJECT DISTANCE O'A IS GREATER THAN OA
PERIPHERAL RAYS ARE CONVERGING AND
ASTIGMATIC

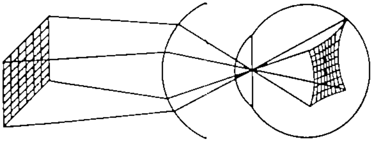
OBJECT DISTANCE O'A EQUALS OA
CURVED FIELD COMPENSATES LATERAL OVERCORRECTION
ASTIGMATISM IS REDUCED

MARGINAL ASTIGMATISM

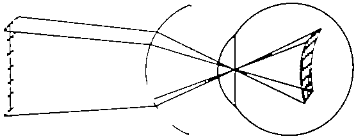
DUE TO OBLIQUE INCIDENCE OF LIGHT RAYS



DISTORTION

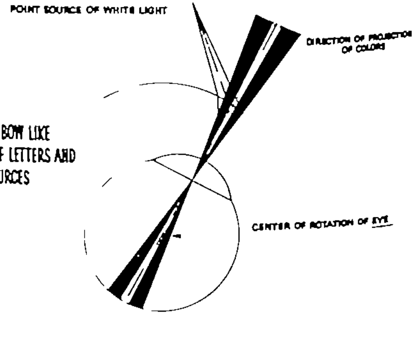


TRANSVERSE - EXCESSIVE LATERAL MAGNIFICATION OF PERIPHERY OF LENS PRODUCES 'PINCUSHIONING'



LONGITUDINAL - FLAT FIELD APPEARS 'CONCAVE'

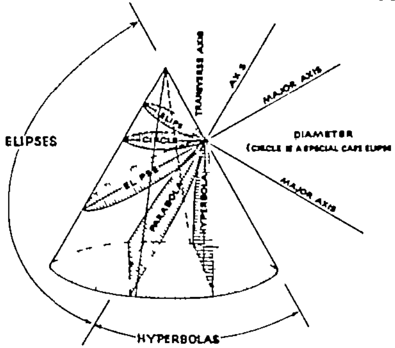
TRANSVERSE
CHROMATIC ABERRATION



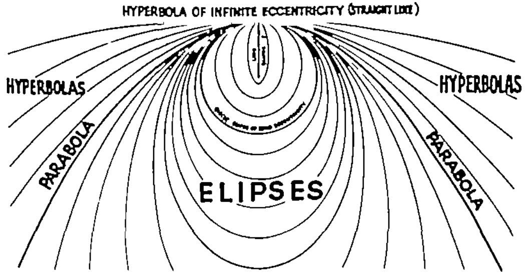
PRODUCES A RAINBOW LIKE BLUR AT BORDERS OF LETTERS AND AT DIRECT LIGHT SOURCES

CONIC SECTIONS

PRODUCED BY PLANE-SECTIONING A RIGHT CIRCULAR CONE



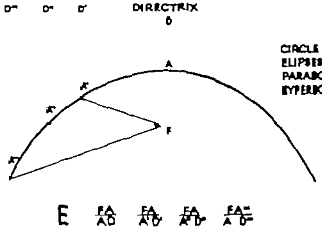
EVERY POSSIBLE CONIC SECTION



ECCENTRICITY (E)

ALL CONIC SECTIONS HAVE A SPECIFIC MATHEMATICAL RELATIONSHIP (ECCENTRICITY) TO A LINE CALLED DIRECTRIX AND A POINT CALLED FOCUS

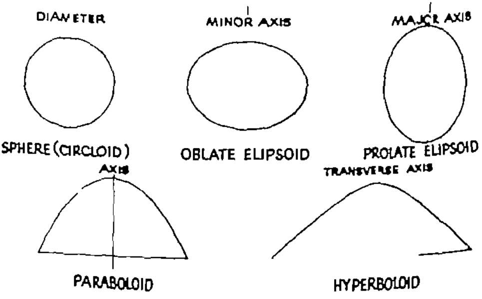
$$E = \frac{\text{FOCAL RADIUS}}{\text{DIRECTRIX DISTANCE}}$$



CIRCLE E 0
ELIPSES E 1 TO +1
PARABOLA E 1
HYPERBOLAS E 1 TO INFINITY

CONOID SURFACES

ARE SURFACES OF REVOLUTION PRODUCED BY ROTATING THE CONIC SECTIONS ABOUT THEIR AXES



CONOID LENSES*

- ARE COMPOSED OF TWO CONOID SURFACES ON A COMMON AXIS
- PROPER BALANCE OF POWER IN THE FRONT AND BACK SURFACES OF CONOID LENSES AND THE PROPER ECCENTRICITIES OF THESE SURFACES IS NECESSARY TO PRODUCE A FLAT ASTIGMATISM FREE DISTORTION FREE FIELD
- CONOID LENSES UP TO 50 DIOPTERS HAVE BEEN DESIGNED WITH EITHER A FLAT OR SPHERICAL SURFACE ON THE BACK SO THAT A PATIENT'S REFRACTIVE CORRECTION CAN BE INCORPORATED INTO THE LENS

*I HAVE NAMED THESE LENSES CONOID SINCE THE TERM CONOID CORRECTLY DESCRIBES THE SURFACES OF THE LENSES

INSUFFICIENT ECCENTRICITY

RESULTS IN

- LATERAL OVERCORRECTION
- POSITIVE MARGINAL ASTIGMATISM
  RADIAL FOCAL LINES ARE POSTERIOR
- DISTORTION PINCUSHIONING AND CONCAVING OF THE FIELD
- INCREASED CHROMATIC ABERRATION

EXCESSIVE ECCENTRICITY

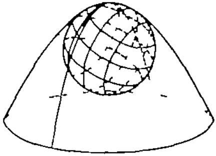
RESULTS IN

- LATERAL UNDERCORRECTION
- NEGATIVE MARGINAL ASTIGMATISM
  CIRCULAR FOCAL LINES ARE POSTERIOR
- DISTORTION BARRELING AN CONVEXING OF THE FIELD
- DECREASED CHROMATIC ABERRATION

CONOID LENS SURFACE

(SPHERE EXCEPTED)

IS AN ASTIGMATIC SURFACE EXCEPT FOR THE PARAXIAL PORTION WHICH APROXIMATES A SPHERICAL SURFACE



THE PARAXIAL POWER OF THE CONOID SURFACE IS THE SAME AS THAT OF THE APROXIMATING SPHERE

THE GREATER THE ECCENTRICITY THE SMALLER THE CONTACTING AREAS OF THE TWO SURFACES AND THE GREATER THE RATE OF INCREASE IN ASTIGMATISM

PARAXIAL REFRACTING POWER OF CONOID SURFACE IS EXPRESSED IN DIOPTERS

$$D \text{ (REFRACTING POWER)} = \frac{n' - n}{F + EF}$$

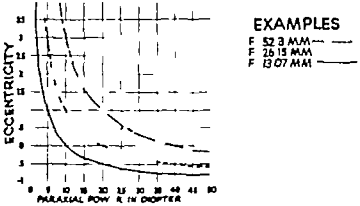
n' INDEX OF REFRACTION OF LENS MEDIA
n OF AIR
F AXIAL FOCAL RADIUS
E ECCENTRICITY

INCREASE IN

ECCENTRICITY

RESULTS IN DECREASES IN

REFRACTING POWER



LOSS OF PARAXIAL POWER CAN BE COMPENSATED FOR BY USING SHORTER FOCUS DISTANCE

CHROMATIC ABERRATION

IS REDUCED IN

CONOID LENSES

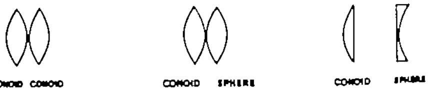


ACHROMATIC CONOID LENSES

REQUIRE LESS COMPENSATING HIGH DISPERSION MINUS LENS

CONOID LENSES
CAN BE USED
IN COMBINATION
WITH
CONOID OR SPHERICAL LENSES

EXAMPLES



CONOID DOUBLET — CONOID-SPHERE DOUBLET — TELESCOPIC LENS

MANY COMBINATIONS ARE POSSIBLE

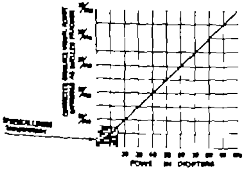
CORRECTION OF
ABERRATIONS
BY USING
CONOID LENSES

- CURVATURE OF THE FIELD IS CORRECTED BY THE GRADUAL REDUCTION IN POWER FROM CENTER TO EDGE OF LENS
- MARGINAL ASTIGMATISM IS NEUTRALIZED BY THE COMPENSATING ASTIGMATISM OF THE CONOID LENS
- DISTORTION BOTH LATERAL AND LONGITUDINAL DISTORTION ARE REDUCED OR ELIMINATED BY THE GRADUAL REDUCTION IN LATERAL POWER AND THE PROPER COMBINATION OF POWER AND ECCENTRICITY OF THE TWO SURFACES
- CHROMATIC ABERRATION IS REDUCED SINCE THE PRISMATIC EFFECT IS REDUCED IN CONOID LENSES

USES and CHARACTERISTICS OF CONOID LENSES

- ARE MADE OF CROWN GLASS
- ARE DESIGNED FOR CLOSE WORK ONLY
- ARE USED MONOCULARLY
- MAY BE USED AS HAND MAGNIFIERS
- RANGE IN POWER FROM 15 TO 100 DIOPTERS
  ARE DESIGNED TO INCORPORATE SPHERICAL AND ASTIGMATIC CORRECTIONS IN THE 15 TO 50 DIOPTER RANGE
- ELIMINATE OR REDUCE THE ABERRATIONS WHICH MAKE SPHERICAL LENSES UNSATISFACTORY
  ARE RELATIVELY THIN AND LIGHT IN WEIGHT
  HIGH POWERS CAN BE MADE IN LARGE DIAMETERS
  HAVE A LARGE CLEAR FIELD
- ARE DESIGNED TO FIT STANDARD METAL OR PLASTIC OPHTHALMIC FRAMES
  ARE DESIGNED TO BE WORN 10 MILLIMETERS FROM THE CORNEA
- ARE PRODUCED IN STANDARDIZED TESTING SETS WHICH UTILIZE PRESENTLY USED TRIAL FRAMES

CORRECTED VISUAL ACUITY AND THE SUGGESTED CONOID LENS POWER TO BE USED FOR READING SMALL PRINT



SUGGESTED POWER IN DIOPTERS = DENOMINATOR OF SNELL FRACTION / 10

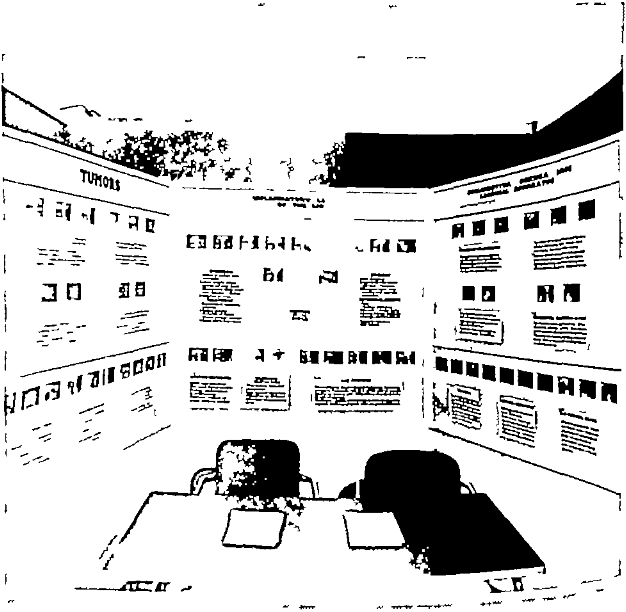
EXAMPLE

VISUAL ACUITY 20/100 LENS POWER 10 DIOPTERS

SUGGESTED POWER OF CONOID LENS MAY VARY FROM ABOVE FORMULA DEPENDING UPON TYPE OF PATHOLOGY CAUSING THE REDUCED VISION

External Diseases of the Eye: Diagnosis and Treatment Everet H. Wood
Jackson Clinic and University of Wisconsin Medical School Madison Wis.

The exhibit consists of multiple kodachromes of external diseases of the eye with explanatory notations regarding diagnosis bacteriology therapy and prognosis where these categories apply Conditions include vaccinia rosacea keratitis tumors of lids pterygia corneal abrasions, corneal ulcers subconjunctival hemorrhages and others.



Smallpox Vaccinia

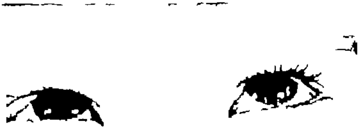
(1) Acute Stage
Yellowish, circumscribed ulcer
(may be multiple)





(2) Partially Healed

(3) Condition At Discharge
from Hospital





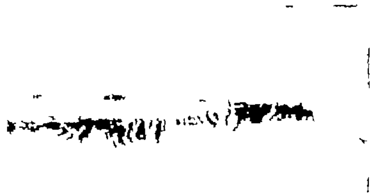
(4) Exacerbation after Six Weeks (Interstitial Keratitis)

(5) Final Result





Impetigo
Superficial, irregular lesion; wrinkled, thin membrane; caused by staphylococcus aureus and reponds readily to antibiotics



Lid Abscess
Single red, indurated tender area, no break in skin, local point of necrosis

Smallpox Vaccinia

Differential diagnosis impetigo contagiosa, varicella, measles, herpes zoster Stevens-Johnson disease (erythema multiforme bullosum) lupus erythematosis, and lid abscess

Diagnosis: history of exposure to vaccination, identification of virus, yellowish circumscribed ulcer (may be multiple) and clinical course of lesions

Treatment: *local* — atropine 1% in eye antibiotic in eye to prevent secondary infection, protection of cornea and other eye

general — gamma globulin, supportive control of fever

Tumors



Pigmented Nevus of Conjunctiva

Present since birth in oriental patient, no change in size over many years, frequent checks, chance of malignant change remote, excision of growth recommended.

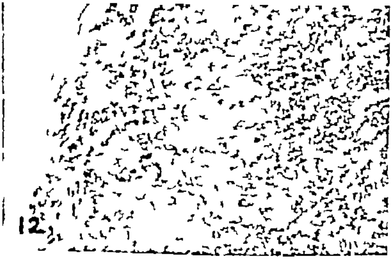
Suspected Cavernous Sinus Thrombosis

Patient struck over left eye by golf club

Malignant Melanoma of Conjunctiva



(Courtesy of Dr. C. W. Asgeens and Dr. E. F. Purcell)



Present many years; suddenly began to grow, simple excision, pigment in cells; mitotic figures rare



Papilloma of Lid



Corrugated surface· pedunculated, keratin horn, surface growth, microscopic large keratin horn cysts and anastomosing cords of epithelial cells

Basal Cell Carcinoma of Lid

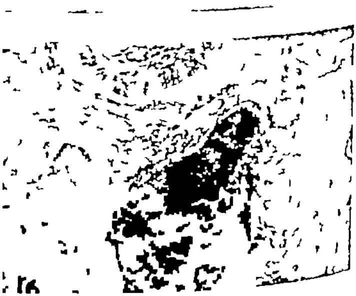




Ulcerated, surface rodent ulcer expanding growth, microscopic palisade arrangement of nuclei in peripheral layers



Basal Cell Carcinoma of Lid
Small, intermittent ulceration of skin



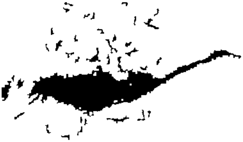


Sebaceous Gland Adenoma



Outer end of lower lid, appeared at first to be infected chalazion, incised and large amount of sebaceous material expressed, continued growth, excised by wide excision and sliding flap six weeks after incision, microscopic: sebaceous gland adenoma (probably malignant)

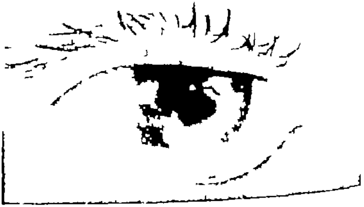
Dermatitis Suspected Carcinoma

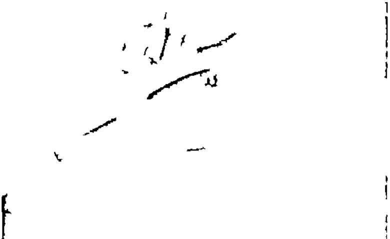




Repeated ulceration over two year period, inflamed area bordered by rolled up edge, resistant to treatment, biopsy of rolled edge, chronic inflammation only finding on microscopic section

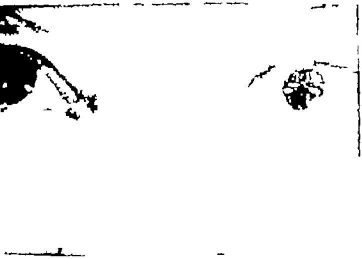
Corneal Abrasion
Struck by snowball, secondary infection, convalescence 3 months





Ruptured Left Eyeball

Result of windshield glass in auto accident

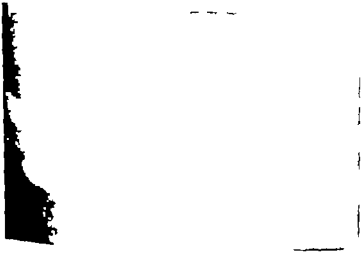


Congenital Coloboma

Congenital anomaly often associated choroidal coloboma as in this case microphthalmic eye in this case



Congenital Fistula of Lacrimal Duct

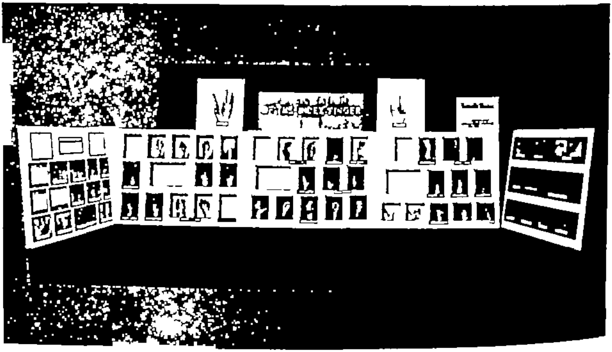


X ray verification

Honorable Mention

Pollicization of the Index Finger R A. Murray Scott and White Clinic, Temple Texas.

The exhibit illustrates replacement of the thumb by transfer of the index finger in three patients; one with congenital absence associated with atresia of the radius and club hand; one with complete loss of the thumb and index metacarpal and a third with traumatic loss of the thumb at the base of the metacarpal Photographs showing pre and postoperative condition and description of operative technique constitute the exhibit

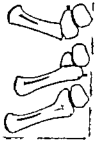
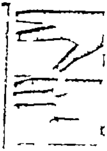


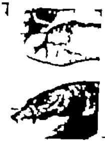
THE THUMB functionally constitutes 50 per cent of the hand. When injury disease or deformity compromises its function, preservation, reconstruction or replacement becomes important Although to preserve or to restore normal prehension, motion, durability sensation and opposition is ideal, it may be possible to supply only the basic function--the ability to contact the remaining fingers in opposition If preservation or reconstruction is impossible due to loss of the entire thumb, replacement by transfer of the index finger is recommended

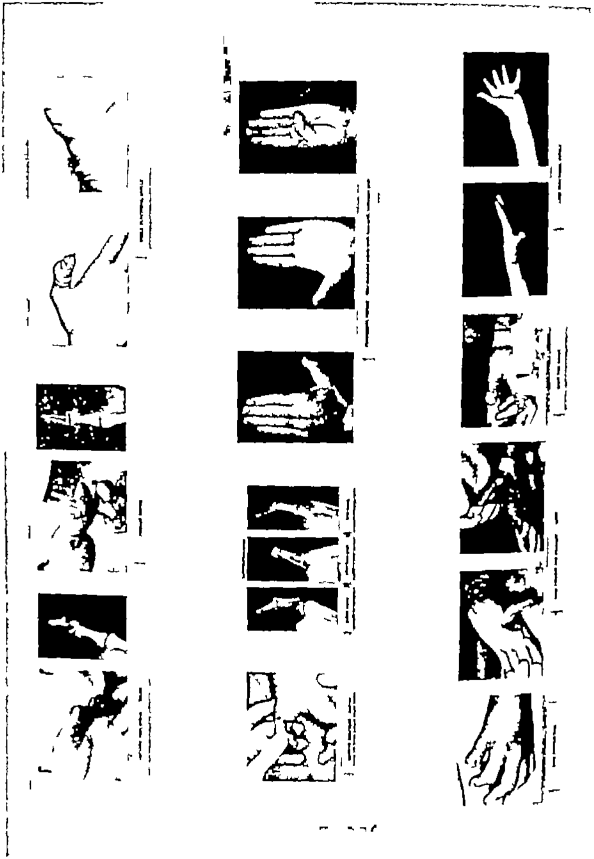


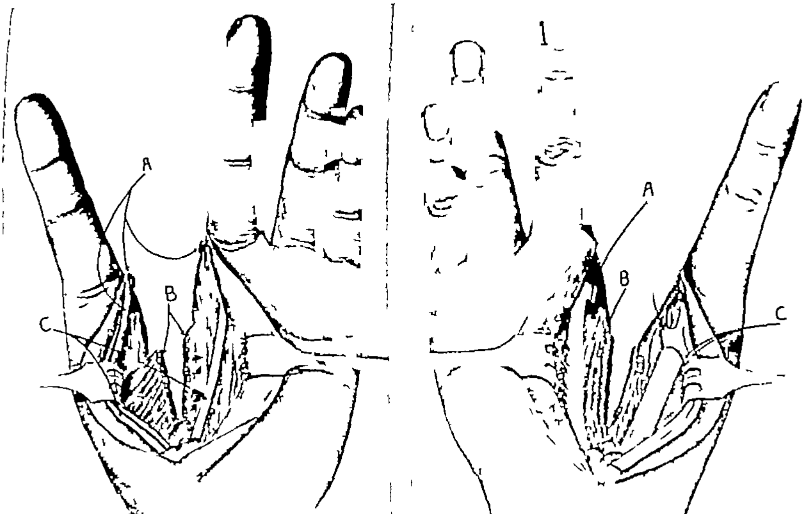








INCISION AND EXPOSURE USED TO MOBILIZE THE INDEX FINGER FOR POLLICIZATION
Palmar view A Digital artery B Adductor pollicis C Digital nerve
Dorsal view A Juncturae tendinum B Second dorsal interosseous C Extensor indicis proprius and extensor digitorum communis

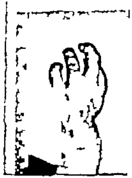
INJURY

Loss of [illegible] and part [illegible] with and [illegible] [illegible] [illegible] of each finger [illegible] [illegible] and [illegible] only [illegible] of metacarpophalangeal joint of middle finger [illegible]

Photographs illustrate [illegible] of hand and arm of skin graft covering [illegible] bone.











RECONSTRUCTIVE PROCEDURES

Staged excision of scar and skin graft.

Pollicization of index finger by incision through web between index and middle finger. Nerves preserved and only vessels to radial aspect of middle finger ligated. Finger stabilized [illegible] the opposing thumb position by large wire. (See Fig. 4) Abdominal pedicle graft transferred to cover defect in new thumb web.

Iliac bone graft from base of phalanx [illegible] the carpus with wire fixation. (See Fig. 16)

Tendon graft for extensor [illegible] new thumb.

Arthroplasty of metacarpophalangeal joint of middle finger.













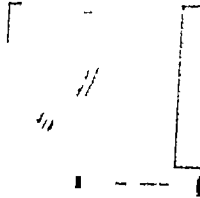
SOLDIER'S WRITTEN

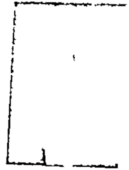
"Today I can use my left hand well enough. There are [illegible] lot of jobs [illegible] can do as well as [illegible] with [illegible] good hand.

[illegible] well pleased with the outcome of the surgery [illegible] [illegible] [illegible]



















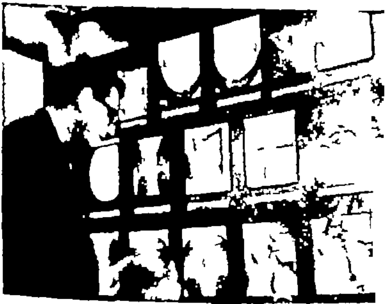




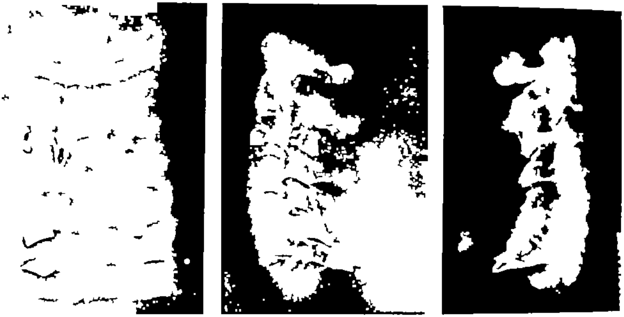


Moderately Severe Whiplash Injuries of the Cervical Vertebrae and Their Radiologic Diagnosis. Martin S. Abel and Richard F. Wagner, San Francisco.

The necks of cadavers at the University of California were subjected to oblique hyperextension and hyperflexion with force calculated to be equivalent to that sustained in whiplash injuries in automobile collision at relatively low speeds. There were thus produced small fractures involving the interarticular isthmus of the lower cervical vertebrae, the transverse processes of C_7, and the elements of the joints of Luschka. Special radiographic techniques were devised to demonstrate these lesions adequately since they were usually not visible on routine views. Apparently identical lesions were found clinically. Presented in the exhibit are cervical spine specimens, microscopic sections therefrom and films of the experimental cadavers. Films of selected patients with similar lesions are shown and compared with the corresponding cadaver films. In both patients and cadavers specialized x-ray techniques are used to demonstrate the lesions.





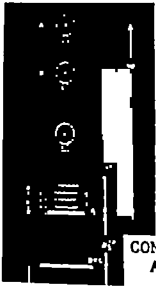


CADAVER A ANATOMICAL STUDIES
WITH WIRES ON RIGHT TRANSVERSE PROCESS & LAMINA C 3
LEAD DISCS IN 5th & 6th APOPHYSEAL JOINTS ON RIGHT

ABOVE Routine Views Note poor visualization of apophyseal joints Note also on lateral view large defect in pars interarticularis of C 7 produced experimentally by forced flexion and extension

BELOW Magnified Views AP angled 30° Caudad and Occipito-Submental View Note excellent visualization of posterior elements in AP view - lead in profile in apophyseal joints See also the projection of the ring of C 1 on the basilar view

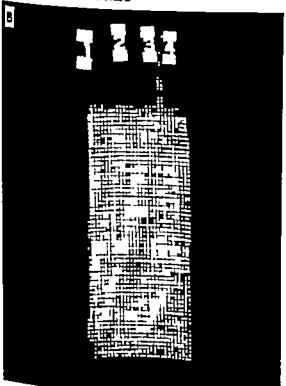


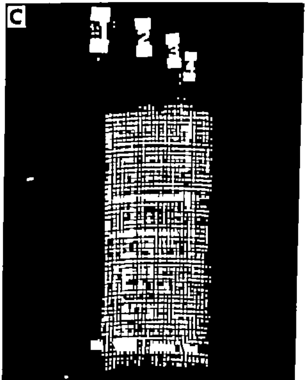




COMPARISON OF TECHNIQUES
CONVENTIONAL, OVERALL MAGNIFICATION
AND DIFFERENTIAL MAGNIFICATION

ABOVE <u>Left</u> Diagram of Phantom and Tube and Film Positions A <u>B & C</u>
<u>Center</u> Film of Individual layers of wire screen phantom
<u>Right</u> Routine Technique A
BELOW <u>Left</u> B Overall Magnification without Differential Magnification
<u>Right</u> C Overall Magnification with Differential Magnification Note separation of the layers of the phantom by differing degrees of enlargement On this film all cuts in screens could be seen and identified as to level
DIFFERENTIAL MAGNIFICATION DEPENDS ON FOCAL SPOT - OBJECT DISTANCE ONLY










COMPARISON STUDIES OF THE AP VIEW ANGLED 30° CAUDAD

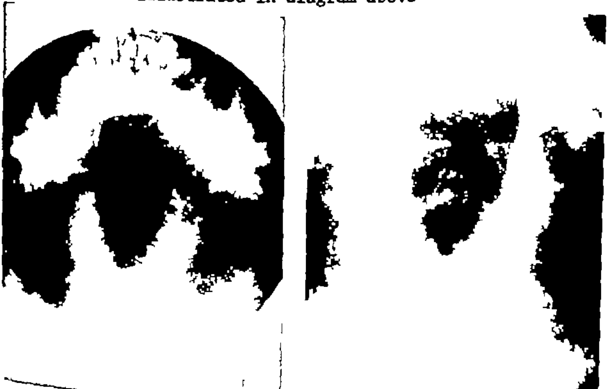
ABOVE <u>Left</u> Diagram of Positioning
<u>Middle</u> Standard AP View for Comparison
<u>Right</u> AP View angled 30° Caudad, 40" Distance no magnification
BELOW <u>Left</u> Differential Magnification Only - Focal Spot Table Top Distance 22", Film in Bucky Tray
<u>Right</u> Differential and Overall Magnification Focal Spot-Table Top Distance 22", Table top-Film Distance 22" Distances are NOT critical This is the optimum film for detail Illustrated by diagram above

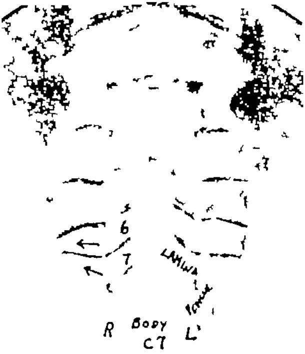


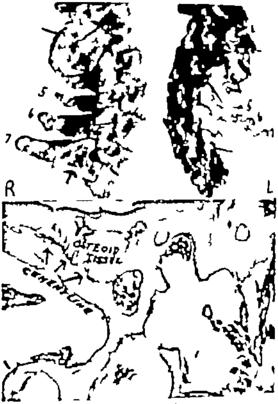



COMPARISON STUDIES OF THE OCCIPITO-SUBMENTAL VIEW

ABOVE <u>Left</u> Diagram of Positioning
<u>Middle</u> Conventional Basilar View of Skull 40' Distance
<u>Right</u> Same Basilar View Considerably Improved by Coning
<u>BELOW</u> <u>Left</u> Differential Magnification Only Focal Spot-Table Top Distance 27", Film in Bucky Tray
<u>Right</u> Differential and Overall Magnification Focal Spot-Table Top Distance 27", Table Top-Film Distance 21" Distances are NOT critical This is the optimum film for detail Illustrated in diagram above







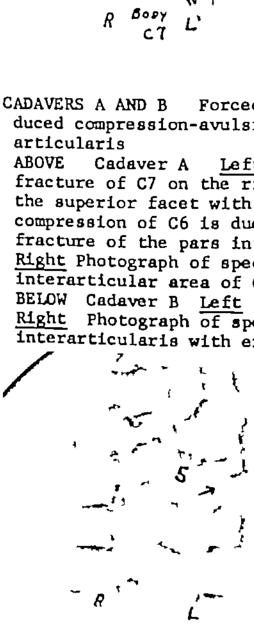
CADAVERS A AND B Forced Hyperextension and Flexion produced compression-avulsion fractures of the pars interarticularis

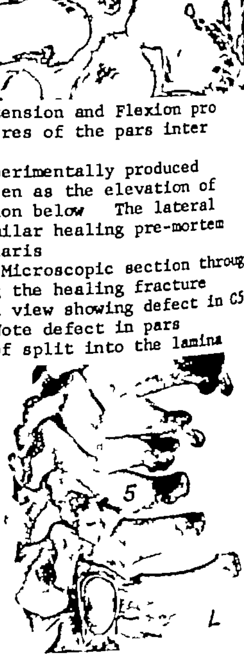
ABOVE Cadaver A <u>Left</u> The experimentally produced fracture of C7 on the right is seen as the elevation of the superior facet with rarefaction below The lateral compression of C6 is due to a similar healing pre-mortem fracture of the pars interarticularis

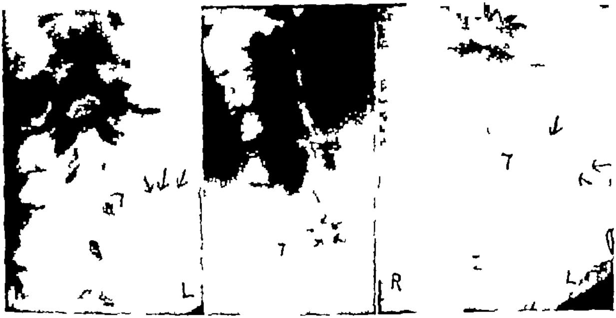
<u>Right</u> Photograph of specimen and Microscopic section through interarticular area of C6 showing the healing fracture

BELOW Cadaver B <u>Left</u> AP-Caudad view showing defect in C5

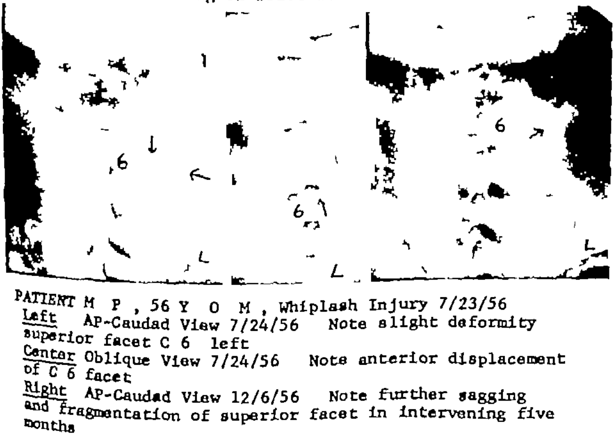
<u>Right</u> Photograph of specimen Note defect in pars interarticularis with extension of split into the lamina



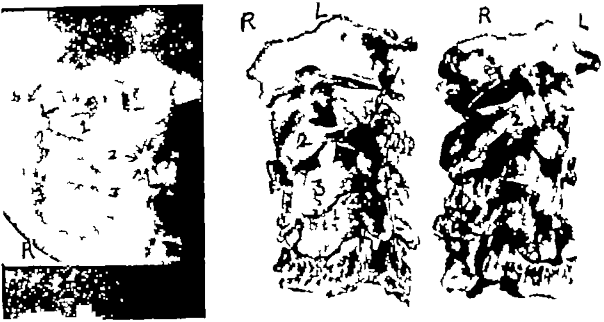




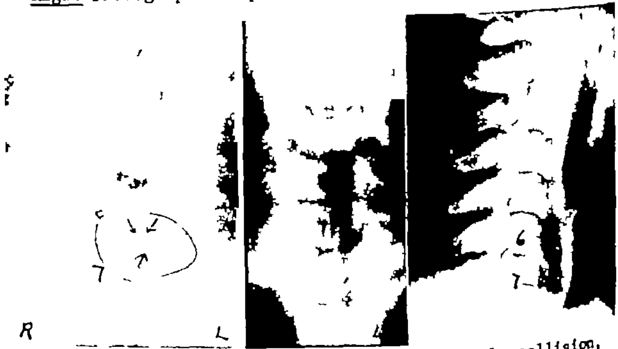
PATIENT R T , 26 Y O M , Whiplash Injury 12/19/55
Left AP-Caudad View 1/4/56 Note elevation superior facet C 7, left and fine vertical fracture lines Cf Cadaver A
Center Oblique View 1/4/56 Note defect of pars interarticularis
Right AP-Caudad View 5/25/57 Compare with original film and note healing of fracture lines and cystic changes



PATIENT M P , 56 Y O M , Whiplash Injury 7/23/56
Left AP-Caudad View 7/24/56 Note slight deformity superior facet C 6 left
Center Oblique View 7/24/56 Note anterior displacement of C 6 facet
Right AP-Caudad View 12/6/56 Note further sagging and fragmentation of superior facet in intervening five months



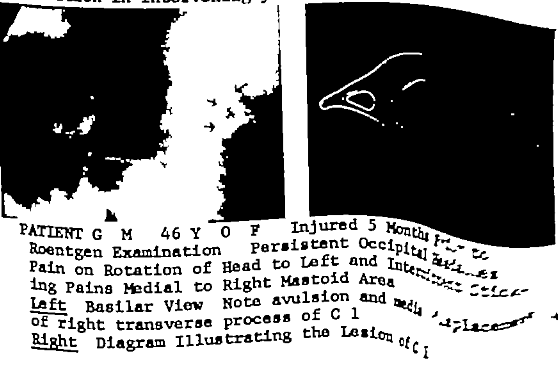
CADAVER C Forced Hyperextension and Flexion produced avulsion fracture of right transverse process of C 1 and fragmentation of both elements of 2nd joint of Luschka on left
Left AP View showing appearance of fractures
Right Photograph of specimen showing lesions



PATIENT I B , Injured 7/10/55, auto-motorcycle collision, crepitus lower neck, left
Left AP View Angled Caphalad 12/16/56 Note fragmentation of 6th Luschka joint on left Cf Luschka joint fracture of Cadaver C
Center Laminagram at 8 cm level showing the lesion
Right Lateral view Note sliver of bone off inferior cortex of C 6 extending anteriorly from joint of Luschka



PATIENT M P , 29 Y O F , Head-On Collision 9/9/55
Cord Bladder & Bowel 9 mos
<u>Left</u> Occipito-Submental View 9/23/55 Note [illegible]
fragmentation and rotation of left transverse proc[illegible]
C 1 (Not visible on open mouth view)
<u>Center</u> Diagram of Lesion of C 1
<u>Right</u> Occipito-Submental View 11/8/56 Note [illegible]
ment in position of fracture fragments and new b[illegible]
formation in intervening year



PATIENT G M 46 Y O F Injured 5 Months [illegible]
Roentgen Examination Persistent Occipital [illegible]
Pain on Rotation of Head to Left and Inte[illegible]
ing Pains Medial to Right Mastoid Area
<u>Left</u> Basilar View Note avulsion and medi[illegible]
of right transverse process of C 1
<u>Right</u> Diagram Illustrating the Lesion of C 1

Hektoen Silver Medal

Chronic Thyroiditis and Autoimmunization. Ernest Witebsky John R. Paine, Kornel Terplan Noel R. Rose and Richard W Egan University of Buffalo School of Medicine and the Buffalo General Hospital Buffalo.

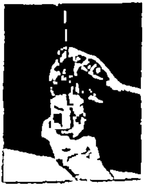
Saline xtracts of thyroid glands of rabbits (as well of dogs and guinea pigs) were combined with Freund adjuvants and injected intradermally into animal of the same species. Many of these animal developed circulating antibodie demonstrable by complement fixation and precipitation, or better by agglutination using erythrocytes treated with diluted tannic acid and coated with the thyroid xtracts. The antibodies proved to be specific for the thyroid. Histological xamination of the thyroids of nimals treated in this manner disclosed evidence of thyroiditis. The autoantibody nature of these thyroid antibodies could be confirmed by thyroidectomizing rabbits nd injecting them with tract of their own thyroid glands.

Sera of patients suffering from chronic thyroiditis were found to contai antibodies against human thyroid extracts as did the sera of animals immunized with thyroid extracts of their own species. I view of the similarity between the findings in experimental animals and in patients suffering from chronic thyroiditis, the significance of thyroid autoantibodies in the pathogenesis of chronic thyroiditis in man is considered. The xhibit xplain the serological tests employed and the results obtained, as well as photomicrographs of histological sections through thyroid glands of immunized animals and patients with chronic thyroiditis.

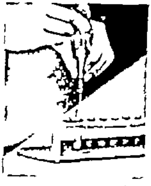
METHOD of PRODUCING
EXPERIMENTAL THYROIDITIS



One lobe of thyroid gland is removed from a rabbit



The thyroid tissue is ground with an equal volume of cold buffered saline solution — using a power-driven Teflon tube homogenizer submerged in ice water



The homogenized thyroid extract r emulsified with Freund's adjuvants (mineral oil lanolin acidfast bacillus mixture) by repeatedly drawing up and expelling rapidly



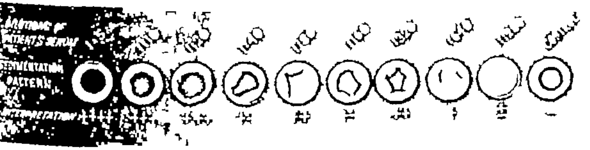
The antigen emulsion is injected into the same rabbit intradermally

Immunologically

Sera of the animals with exp rimental thyroiditis contain thyroid antibodies. Sera of certain patients with chronic thyroiditis contain thyroid antibodies. For detecting the presence of these antibodies precipitation complement fixation or tanned cell hemagglutination tests are employed

TANNED CELL HEMAGGLUTINATION TEST

Thyroid antibodies [illegible] agglutination of tanned and treated human erythrocytes coated with thyroid antigen. Reactions are recognized by distinctive patterns of cells sedimented on the bottom of the tube. Control tube contains tanned but uncoated cells



GEL PRECIPITATION TEST

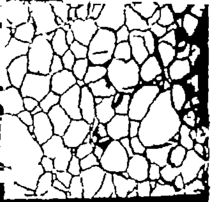


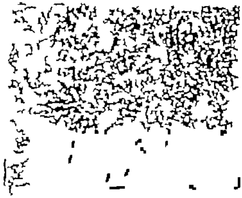
Antigen diffuses downward and antibody upward meeting in the plain agar to form a visible band of immune precipitate

CHRONIC THYROIDITIS IN HUMANS resembles EXPERIMENTAL THYROIDITIS IN ANIMALS

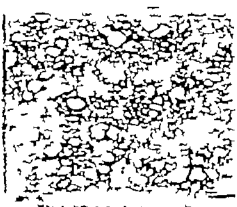
Histologically

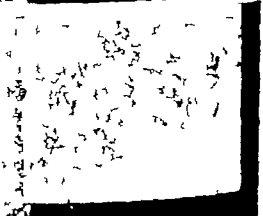
Concurrently with antibody production, experimental animals develop lesions in their thyroid glands characterized as thyroiditis. The histological changes seen in immunized animals resemble certain forms of chronic thyroiditis in the human.

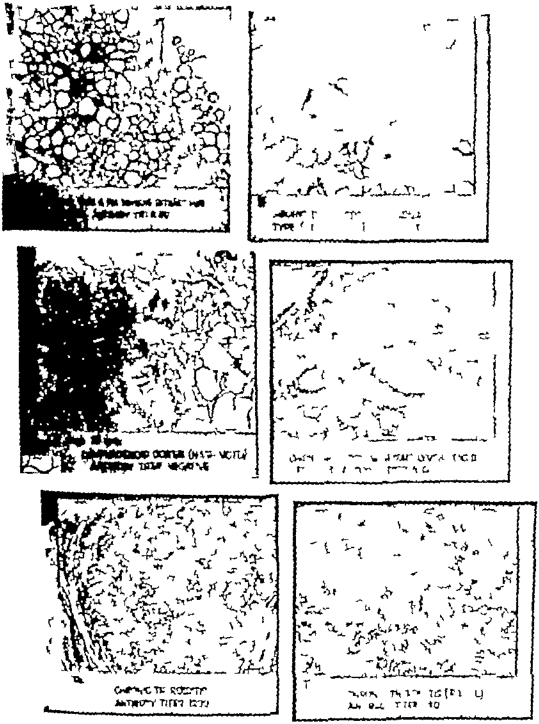


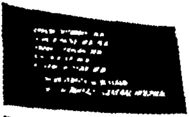




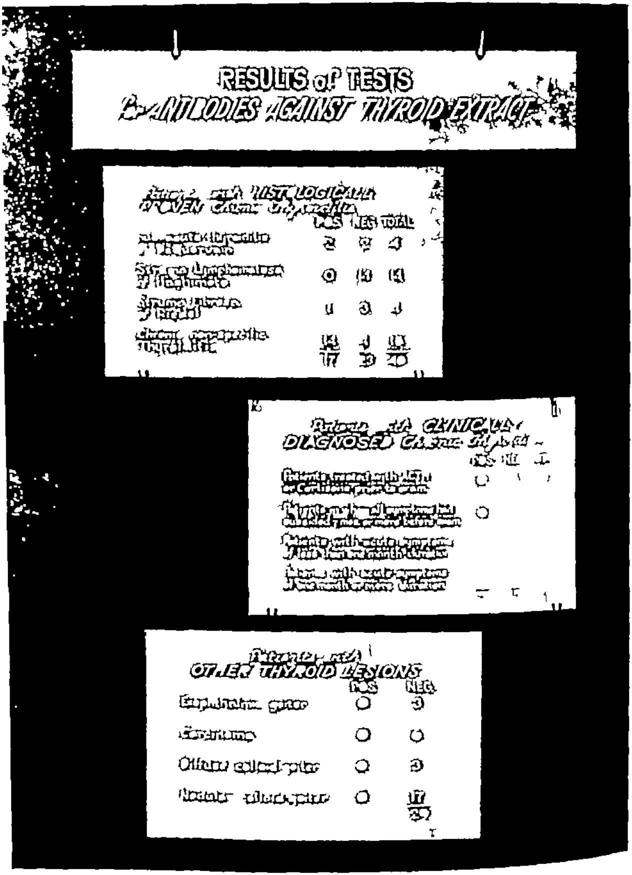








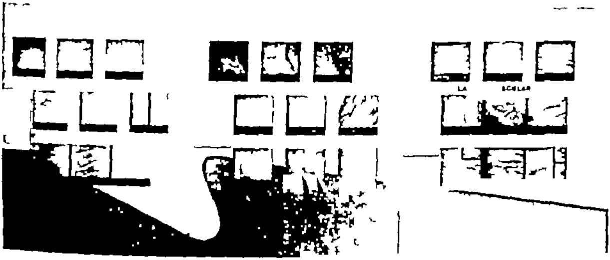
THIS EVIDENCE INDICATES THAT THE PATHOGENESIS OF SOME TYPES OF CHRONIC THYROIDITIS IN MAN IS RELATED TO AUTO-IMMUNIZATION AGAINST CONSTITUENTS OF A PATIENT'S OWN THYROID GLAND


RESULTS of TESTS
for ANTIBODIES AGAINST THYROID EXTRACT
POS. NEG. TOTAL
Patients with CLINICALLY DIAGNOSED
Patients with acute symptoms of less than one month duration
Patients with acute symptoms of one month or more duration
OTHER THYROID LESIONS
POS. NEG.
Carcinoma

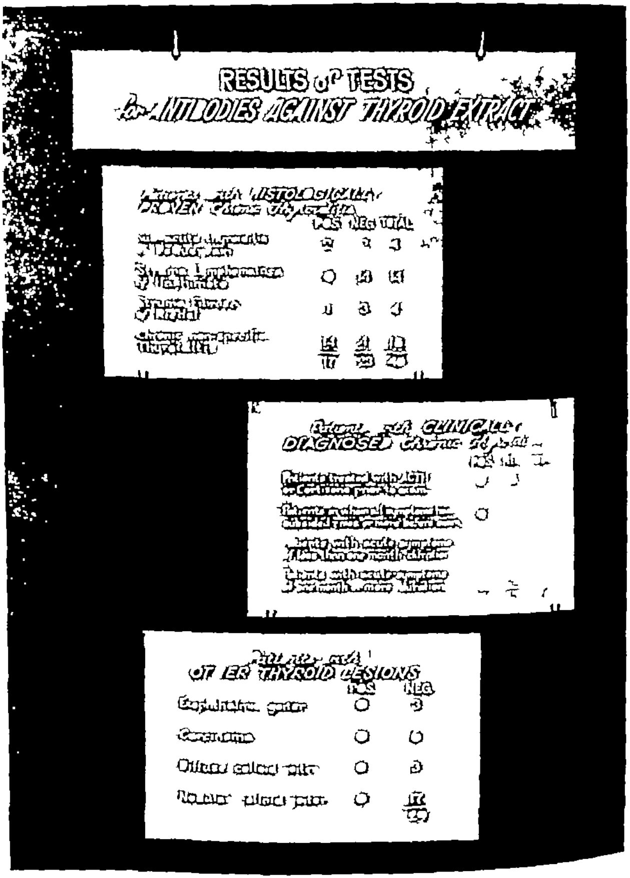
Certificate of Merit

Myocarditis: A Frequent Complication in Systemic Disease William C. Manion Armed Forces Institute of Pathology Washington D C

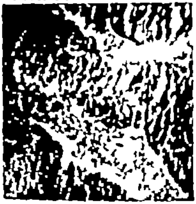
The myocardial changes found in a number of diseases are presented including (1) post infectious myocarditis—post bacterial post rickettsial and post viral (2) fungal diseases involving the myocardium (3) parasitic diseases involving the myocardium (4) collagen diseases involving the myocardium (5) metabolic and physical diseases including the poisons involving the myocardium. A brief discussion of the pathology of each group is presented



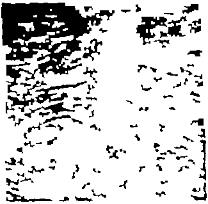



RESULTS of TESTS
for ANTIBODIES AGAINST THYROID EXTRACT
POS. NEG. TOTAL
THYROID LESIONS
POS. NEG.
Carcinoma

VIRAL



Measles Encephalitis Myocarditis. X218 – Three year old white female who died of post measles encephalitis. AFIP Acc. 643286

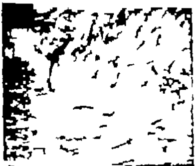


Small Pox, Myocardium. X360 – Interstitial myocarditis in fatal case of small pox. AFIP Acc 278719



Post Vaccinial Encephalitis Myocarditis. X450 – A twenty year old white male who died with acute encephalitis 8 days after receiving small pox vaccination. AFIP Acc. 636051

SPIROCHAETAL



Weil's Disease. X335 – Interstitial myocarditis in 30 year old white male with history of chills, fever, nausea and vomiting of 10 days duration with positive agglutination for Leptospira and histologically demonstrated spirochetes. Contributor, R. D. Lilly USPH, Bethesda, Maryland. AFIP Acc. 97296



Relapsing Fever X216 – Interstitial myocarditis with overwhelming Borrelia septicemia and hepatic involvement in 40 year old Chinese soldier. AFIP Acc. 133806

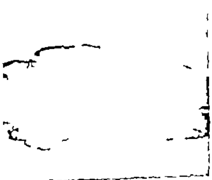


Relapsing Fever (Warthin Story). X356 Showing Borrelia recurrentis organisms present in myocardium. AFIP Acc. 133806

GRANULOMATOUS



Tuberculosis. X240 – Chronic focal tuberculous myocarditis in 35 year old white male with 9 year history of pulmonary tuberculosis. AFIP Acc. 333180



Syphilitic Gumma, Heart. X4 – A 57 year old negro male with positive serology (Kahn, 1 quantitative Kahn 32 units; numerous EKG tracings demonstrated complete heart block). AFIP Acc. 335743

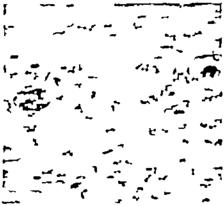


Granulomatous Myocarditis. X300 – Associated with Boeck's sarcoidosis of the tracheal and bronchial lymph nodes, spleen, liver, pancreas and kidney in 46 year old white male. AFIP Acc 203191

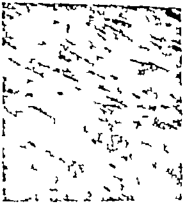
IDIOPATHIC



Granulomatou (Isolated) Myocarditis. X400 – I an 18 year old white mal with history f swelling of the legs of one year duration. Allergi ? AFIP Acc 313700

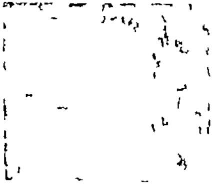


Gran lomatou (Isolated) Myocarditis. X400 – (Same Case) Allergi ? AFIP Acc. 313700



Diffus Interstitial Myocardit Idiopathi (Fiedler') X360 – AFIP Acc. 324994

COLLAGEN VASCULAR



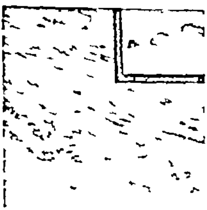
Aschoff Nodule Myocardium Rheumati Heart Di ease X295 – A 20 year ld white mal with chief complaint of pai and swelling I both knee and pai in ankles, lower back, wri ts elbow and shoulders. Cli ic lly rheumatic fever Death 17 day after adml sion AFIP Acc. 74155



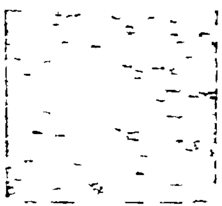
Rheumatoid Nodul Myocardium. X205 – A 38 year ld white mal with bvious fl xion deformiti of the distal phalangeal joint f hands. Similar appearance of toe with swelling. All major joi t pai ful on motion. Many subcutaneou nodules present. AFIP Acc. 490285



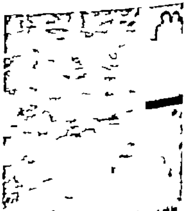
Periarteriti Nodosa, Myocardium. X245 – A 28 year old white male with chief complaint of wheezing sensation i chest with nonproductive cough. Death 4 month after admi sion of periarteritis. AFIP Acc. 604604



Lupu Erythematosus, Myocardium. X300. (I set) Mitral Valve Lesion – A 21 year ld white mal with history f having ki rash biopsied and diagnosed lup erythematosus. Death 12 day fter admi ion. AFIP A c. 87349



Scleroderma, Myocardium. X410 – A 24 year old white mal with hief complaint f headache with pai and left facial paraly is. Skin f extremiti showed fibrous thickeni g, haracteristi f cleroderma. Death of pulmonary fibro i and pulmonary edema. AFIP Acc. 488197



Dermatomyositis. X187 – Insert skin and skeletal muscle – A 58 year ld white male di betic, hi chief complaint of difficulty in walking, generalized pain and swelling of the face hand and legs. Clinical diagnosi dermatomyositis.

FUNGAL



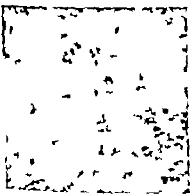
Coccidioidal Granuloma of the Myocardium. AFIP Acc. 114420



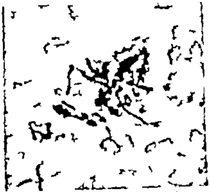
Actinomycosis, Myocardium. X112 – A 30 year [illegible] ld Korean mal[illegible] with subcutaneous [illegible] bsce[illegible] of brea[illegible] t with extension through the che[illegible] wall involving the pericardium and myocardium. AFIP Acc. 618421



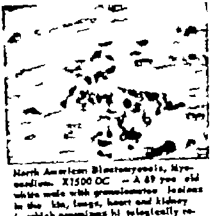
Granulomatous Myocardit[illegible] [illegible] Di[illegible] seminated Hi[illegible] topl asmosis. X117 – A 54 year old white male with di[illegible] seminated histoplasmosi[illegible] histologically demonstrated in lungs, liver [illegible] pleen bone marrow kidneys, lymph nod[illegible] [illegible] stomach and tongue. AFIP Acc. 121747



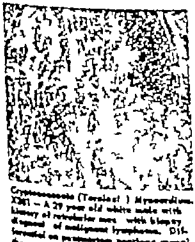
Aspergillosis, Myocardium. X410 – An 18 year [illegible] ld white male with hi[illegible] tory of six months fever [illegible] f unknown etiology. Culture from myocardium identified [illegible] aspergillus flavus. AFIP Acc 899250



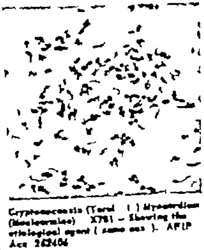
Moniliasi[illegible] Myocardium. Gridley X1125 OCL – A 21 year old white male with [illegible]xtensive burns complicated by candida septicemia and focal [illegible]bscesses of brain heart, lung [illegible] and kidneys. AFIP Acc. 500930



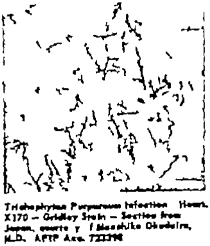
North American Blastomycosis, Myocardium. X1500 OC [illegible] – A 69 yea[illegible] old white male with granulomatous lesions in the [illegible] kin, lungs, heart and kidney [illegible] i[illegible] which organisms hi[illegible] tologically resembling North American bla[illegible] tomyce[illegible] s[illegible] are present. Contributor: R. C. Dunn, M.D., Iowa Methodist Hospital De[illegible] Moines, Iowa. AFIP Acc. 609081



Cryptococcosis (Torulosi[illegible]) Myocardium. X281 – A 29 year old white male with history of retrobulbar mas[illegible] with biopsy diagnosi[illegible] of malignant lymphoma. Differential on postmortem sections reveal the presence of cryptococcus neoformans in the choroid of the eyes, lungs, liver and heart. AFIP Acc. 262406



Cryptococcosis (Torul[illegible] [illegible]) Myocardium (Mucicarmine) X781 – Showing the etiological agent (same cas[illegible]). AFIP Acc 262406



Trichophyton Purpureum Infection [illegible] Heart. X170 – Gridley Stain – Section from Japan, courte[illegible] y [illegible] f Masahiko Okudaira, M.D. AFIP Acc. 722398



Myocarditis A sociated with Trichinelliasis. X507 – A 22 year old white male with chief complaints f bdominal cramp and diarrhea. History of ingestion from raw pork. P sitive ki test Trichinella larvae present in muscles and diaphragm. Death 15th hospi tal day AFIP Acc. 110992



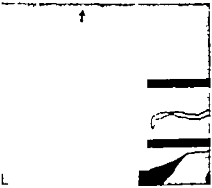
Myocarditis Schistosomi sis. X675 – Schistosoma ova i the heart Contributor: Dr J. N. Davi s, Makere Medical College Kampala, Uganda.



Myocardium in Fatal Plasmodium Falciparum Infection. X507 – Clinical hi tory not available. Contributor Prof. Rudolph Jaffe, Caracas, Venezuela. AFIP Acc. 1012770



Echinococcus, Cyst, Myocardium. X88 – A 30 year old male with hydatid cyst f the myocardium of the right ventricle with perforation into the ventricl and occlusion of the left pulmonary artery by intra-arteri l echinococco is. Contributor: Dr Davi Mendoza Montevideo Uruguay AFIP Acc. 673478



Cysticerco i Myocardium. X13 – (A) Organisms from Cyst f Ventri l (B) Lesion in Brai with Organisms. – A 35 year old mal Korean. Admitted to hospital because of mental confu ion. P st-mortem xamination revealed numerous cysts of the cerebral hemisphere the heart and the pectoral muscles. AFIP Acc. 582814



Paragonimiasis Heart. X75 A 3 year old Korean child with widespread systemic involvement. AFIP Acc. 573942



Toxoplasmosis, Myocardium. X1050 (Oil) – Cli ical history not available Contributor: W. A. D. Anderson, St Loui Univer ity St. Loui Mi souri. AFIP A c. 97029



Chagas Disease Myocardium. X1350 (Oil) – Clini al hi tory not available. Courtesy of: Dr Hertz, San Cristobal Venezuela. AFIP Acc. 646005



Leishmaniasis Heart. X51 – A 40 year old colored male soldier with visceral leishmaniasis involving the heart liver lymph nodes, bone marrow and kidneys. AFIP Acc. 284719

PARASITIC



Strongyloidiasi Heart. X810 – Strongyloidiasi stercorali infestation involving the stomach, small and large intestine appendix, mesentery and mesenteric lymph nodes, lungs, trachea, heart liver and gallbladder Contributor: Boston City Hospital, (Kyle, McKay and Sparling).



Amebiasi Heart. X292 – Amebi is, large intestine, E. histolytica type with secondary inf station of liver ight lung, heart ight and left ventricl and pituitary AFIP Acc. 184125



Filariasi Heart X1464 – A 16 year ld male, native f Britt h Guiana. Contributor: Dr. Philip Hart San Cristobal, Hospital Vargo Trachera, Venezuela.

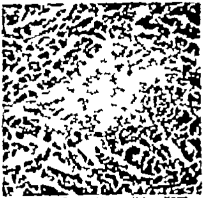
PHYSICAL METABOLIC AND TOXINS



Arsenic Poisoning Myocarditis. X435 –A 22 year ld white male, dying 24 hours the ingestion of arsenic T i xological examination showed presence of large amount of arseni in it sue AFIP Acc. 695469



Ethylene Glycol Poisoning Myocarditis. X355 – A 21 year old white male who died following the ingestion f an unknown amount of ethylene glyc L AFIP Acc. 203706



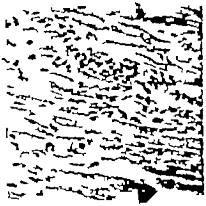
Myasthenia Gravi Myocarditis. X370 – Photomicrograph from case reported by H Mendelow M.D and D. Gookins, M.D The Mount Sinai Ho pital Journal 1954, Mount Sinai Hospital New York City New York AFIP Acc. 728381



Myocarditum, Heat Stroke. X410 – A 70 year old white mal who collapsed following walking hike. Admitted to hospital in shock and temperature of 108.4° Death sixteen hours after onset f symptoms. AFIP Acc. 625398



P st-Traumatic Myocarditis. X410 – A 74 year ld white male who developed what appeared to be Stokes-Adams syndrome treated by intracardiac injection of adrenalin. Recovery followed by death i 12 days. Surface ski carried into myocardium by needle. AFIP Acc. 591518



Myocarditis (Atomi Bomb Casualty). X600 – AFIP Acc. 259092

Myocarditis as a diagnostic term has varied considerably in scope and interpretation during the last century. For a time it was used to designate all afflictions of the heart regardless of their etiology and because of this loose usage it soon fell into disrepute. This served to narrow the scope of the diagnosis greatly so that some physicians regarded the term as applicable only to the changes produced in the myocardium by rheumatic heart disease or diphtheria. The recent reawakening of interest in the pathology of heart disease once again has focused attention on the morphologic changes in the myocardium during the course of disease and this has led to the recognition that myocarditis is not a rare but a frequent complication of many systemic diseases.

Myocarditis has been reported in the literature in over fifty different diseases, and while it may not always be a complication of the disease, the recognition of this possibility may be life saving. It is probable that a more careful study of the heart utilizing bacterial and viral cultures, multiple blocks and sections and selective stains may reveal a higher frequency of myocarditis in many diseases. This would serve to bring about a closer correlation of the clinical signs and symptoms and the morphologic changes of the heart.

The purpose of this exhibit is to illustrate the range of diseases in which myocarditis may occur with photomicrographs of representative lesions. The classification used is based on etiology in full realization that such a classification, while unsatisfactory for the pathologist, is valuable to the clinician. In many cases the changes in the myocardium admittedly are non-specific and diagnosis cannot be made from the morphologic picture alone but must depend on the clinical history, bacterial and viral cultures, agglutination tests and other clinical laboratory procedures. Often, however, the etiologic agent can be demonstrated in the heart lesions and a specific diagnosis made.

In some cases of myocarditis the etiologic agent is unknown and there is no associated systemic disease which can be held accountable for the myocardial lesion. This most interesting group is classified in this exhibit as Idiopathic Myocarditis.

For the purpose of this exhibit myocarditis is divided into five major groups:

GROUP I INFECTIOUS ETIOLOGICAL AGENTS. This is the largest of the groups and included in it are many of the common diseases. The frequency of myocarditis is greatest in this group however its incidence varies with each disease.

(a) BACTERIAL ORIGIN: Acute Nasopharyngitis and Tonsillitis; Brucellosis; Dysentery; Meningitis; Scarlet Fever; Tetanus; Tularemia; Bronchopneumonia; Diphtheria; Gonorrhea; Pertussis; Septicemia, staphylococcus, and streptococcus; Tuberculosis

(b) RICKETTSIAL ORIGIN: Epidemic Typhus (European); Epidemic Murine Typhus; Scrub Typhus (Tsutsugamushi); Rocky Mountain Spotted Fever

(c) VIRAL ORIGIN: Atypical Pneumonia; Bayou Fever; Chickenpox; Coxsackie; Epidemic Hemorrhagic Fever (viral ?); Guillain Barre Syndrome; Mumps; Ornithosis; Poliomyelitis; Post Vaccinal Encephalitis; Rubeola; Upper Respiratory Infections; Infectious Mononucleosis (viral ?); Infectious Hepatitis; Influenza; Yellow Fever; Smallpox

(d) SPIROCHAETAL AND TREPONEMAL ORIGIN: Weil's Disease; Syphilis; Relapsing Fever

(e) FUNGAL ORIGIN: Actinomycosis; Aspergillosis; Coccidiomycosis; Cryptococcosis; Histoplasmosis; Mucormycosis; Nocardiosis; North American Blastomycosis; Trichophytosis (T. purpureum); Moniliasis

(f) PARASITIC ORIGIN: Amebiasis; Balantidiasis; Chagas' Disease; Cysticercosis; Echinococcus Disease; Filariasis; Heterophydiasis; Leishmaniasis (Kala-Azar); Malaria; Paragonimiasis; Sarcosporidiosis; Toxoplasmosis; Trichinosis; Trypanosomiasis; Schistosomiasis; Sparganosis; Strongyloidiasis

GROUP II COLLAGEN VASCULAR DISEASE: Rheumatic Fever; Rheumatoid Arthritis; Polyarteritis Nodosa; Lupus Erythematosus; Dermatomyositis; Scleroderma

GROUP III PHYSICAL, METABOLIC, AND TOXIC ORIGIN: Arsenic Poisoning; Diphtheria Toxin; Emetine; Ethylene Glycol Poisoning; Heat Stroke; Hypokalemia; Myasthenia Gravis; Radiation; Trauma, Thermal (Burns); Uremia

GROUP IV SARCOIDOSIS

GROUP V IDIOPATHIC: Diffuse Interstitial Type; Granulomatous Type; Giant Cell Myocarditis

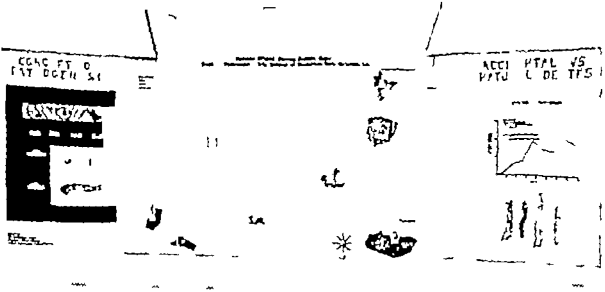
Although sarcoid is grouped with the granulomatous diseases for exhibit purposes, it is probably best to create a special grouping since the etiology is still unknown. The so-called sarcoid tissue reaction is considered non-specific by this observer. The diagnosis of sarcoid is based on an evaluation of the clinical history, the radiological and bacteriological findings, and the result of the Kveim test as well as the morphologic findings.

The photomicrographs used in this exhibit are from cases in the files of the Cardiovascular Registry of the Armed Forces Institute of Pathology, Washington, D. C. We are greatly indebted to the many pathologists and clinicians, both in this country and abroad, who have contributed slides and material to make this [illegible] [illegible] possible.

Honorable Mention

Natural History of Atherosclerosis. R. L. Holman, H. C. McGill Jr., J. P. Strong, O. R. Griffin, and J. C. Geer. Louisiana State University School of Medicine, New Orleans.

The exhibit shows (1) concept of pathogenesis—the sequential stages of atherosclerosis, fatty streak, fibrous plaque, complication, disease—are presented and illustrated with formalin fixed specimens (aortas and coronary arteries), that have been stained with Sudan IV and mounted in plastic bags (2) the results on over 1,000 aortas from seven geographic areas (Southern U. S., England, Spain, South Africa, Costa Rica, Puerto Rico and Guatemala) are presented in map and summary form; (3) graph comparing the degree of atherosclerosis in cases of accidental deaths to that in cases of deaths from natural causes.



The anatomic changes related to atherosclerosis in over 1200 aortas from necropsies on individuals, aged 1 to 40, performed in seven geographic areas [New Orleans, Spain, South Africa, England, Puerto Rico, Guatemala and Costa Rica] have been studied qualitatively, quantitatively and topographically before and after staining them with Sudan IV [to bring out in sharp contrast the early fatty streaks that constitute the first change]

CONCEPT OF PATHOGENESIS

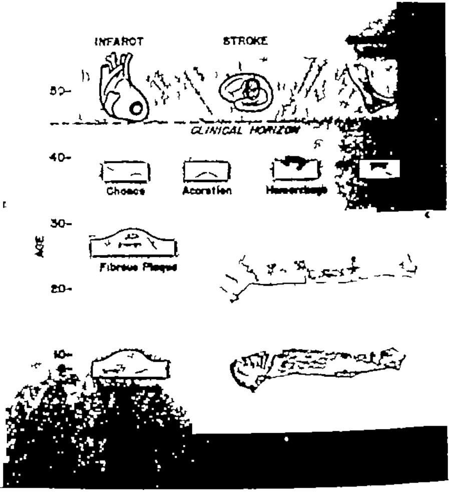
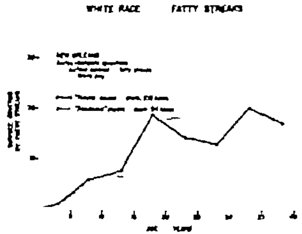
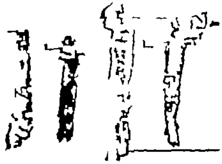


EXHIBIT BY
Dan Alvarado & Lee La Scala
Department of Medical Illustration
Louisiana State University School of Medicine

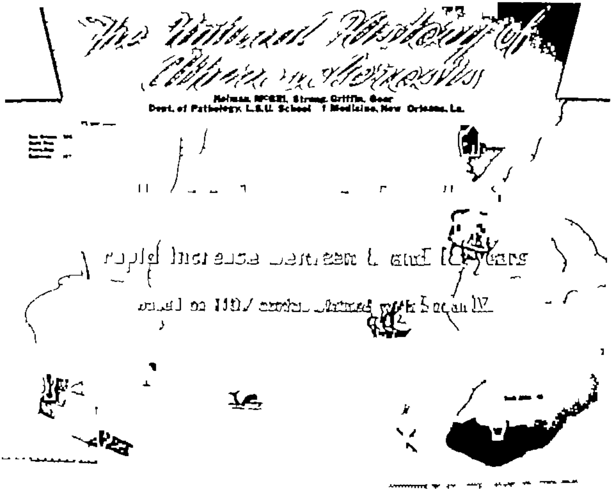
Our studies to date have indicated that atherosclerosis developes by definite sequential stages - [1] fatty streak, [2] fibrous plaque [3] complication [e g thrombosis or hemorrhage] [4] clinical disease - and that each stage is a necessary precursor for the following one The factors responsible for succeeding stages may be, and probably are, different from those that initiated the first stage [atherogenesis] Thus intelligent therapy must take cognizance of these different stages, for that which may be effective against one stage may be ineffective or even contraindicated against another stage

ACCIDENTAL VS. NATURAL DEATHS





The degree of fatty streaking of the aorta in cases of sudden accidental death [automobile accidents gun-shot wounds, etc] has been as great or greater than it has been in cases of death due to natural causes Thus the terminal illness is not the determinating factor



Every child beyond the age of three years in all parts of the world thus far sampled - despite the widely varying genetic and environmental backgrounds represented by the seven geographic areas studied - has shown some degree of sudanophilic fatty streaking of the aorta and this has been confirmed by histologic and histochemical studies This has raised serious fundamental questions [1] about the definition of Normal and [2] about the relationship of diet to atherogenesis

In all parts of the world that have been studied thus far, a rapid increase in fatty streaks [expressed as percentage of the inner surface of the aorta that stains red with Sudan IV] has occurred between the ages of 8 to 18 years This has suggested a relationship of atherogenesis to the hormonal changes of puberty

The Jaundiced Neonate: Differential Diagnosis and Management

Victor C. Vaughan III and Frouzandeh B Brelian, Temple Uni ersity School of Medicine Philadelphia

The differential diagnosis and management of icterus in the newborn period is presented with special attention to hemolytic disease of the new born and the prevention of kernicterus. The frequency with which A or B incompatibility is responsible for clinical hemolytic disease is emphasized and the experience over a four year period of Temple University Hospital and of St. Christopher's Hospital for Children is reviewed

Jaundice is common in newborn infants

Neonatal icterus is a [sign]

BUT

BUT

*Present address, Medical College of Georgia, Augusta, Georgia

JAUNDICE IS C O M M O N IN NEWBORN INFANTS

At Temple University Hospital

icterus is seen within the first six days of life

in about 35% of white infants

in about 15% of negro infants

JAUNDICE IS A S I G N NOT A CLINICAL ENTITY

Neonatal icterus may be a sign of

icterus neonatorum
hemolytic disease of the newborn (erythroblastosis fetalis)
sepsis with or without bronchopneumonia skin infection
urinary tract infection meningitis etc
hepatitis -herpetic other viral syphilitic etc
toxoplasmosis or cytomegalic inclusion disease
metabolic disorders galactosemia cretinism spherocytosis
congenital nonhemolytic jaundice (Gilbert) etc
obstructive disorders inspissated bile syndrome biliary
atresias tumors etc

THE PHYSICIAN MUST SEEK A DIAGNOSIS

IN ORDER TO PLAN ADEQUATE THERAPY

Diagnostic studies should include

routine hematologic study
serologic study for isoimmunization
bacteriologic culture of blood and of any local exudate
urinalysis (often with search for cytomegalic inclusion bodies)
level of serum bilirubin (an essential guide to therapy)

The exact nature of any particular clinical problem may suggest many further studies and may call for pathologic radiologic, or surgical assistance

MOST ICTERUS IN NEWBORN INFANTS

IS NOT HEMOLYTIC DISEASE BUT

After icterus neonatorum hemolytic disease is the most common cause of icterus in new born infants it affects about 1% of all infants and causes most cases of severe icterus in mature infants

HEMOLYTIC DISEASE MAY BE MORE COMMONLY DUE TO A OR B INCOMPATIBILITY THAN TO RH INCOMPATIBILITY

At Temple University Hospital where these conditions occur with approximately their natural frequencies

0 5% of infants have clinical hemolytic disease due to A or B incompatibility

0 35% have clinical hemolytic disease due to Rh incompatibility

The relatively low incidence of Rh incompatibilty reflects the high proportion of negro infants observed (50%)

HEMOLYTIC DISEASE DUE TO A OR B INCOMPATIBILITY IS GENERALLY MILDER THAN HEMOLYTIC DISEASE DUE TO RH INCOMPATIBILITY BUT

Kernicterus occurs:

At Temple University Hospital

in about 9000 deliveries

one infant with kernicterus due to B isoimmunization (untreated)

This represents one case in an estimated 45 clinical cases of A or B isoimmunization

At St Christopher s Hospital for Children

of 27 cases of cerebral palsy traced to kernciterus:

15 were due to Rh
6 were due to A
4 were due to B
1 each to c(hr) and to hereditary spherocytosis

FEATURES OF A AND B INCOMPATIBILITY

MAY BE CONTRASTED WITH THOSE OF RH INCOMPATIBILITY

Clinical Features

In A or B incompatibility	In Rh incompatibility
case-finding is postnatal early or intense icterus	case finding is antenatal maternal blood titer
first born commonly affected	first-born rarely affected unless mother transfused
a less severe illness still-birth very rare hemolytic process mild subclinical form common (60-80%)	a more severe illness still birth common anemia often severe rarely subclinical (20%)
kernicterus occurs in 2% or more of clinical cases (may be higher if untreated)	kernicterus common 15% in untreated cases 35% with improper treatment high frequency in prematures
aim of therapy prevent kernicterus	aim of therapy often to relieve anemia as well as prevent kernicterus

Clinicopathologic Features

In A or B incompatibility	In Rh incompatibility
mother usually group O infant A or B (rarely AB) (Rh incompatibility may incidentally coexist)	mother Rh negative (D negative) infant Rh (D) positive (A or B incompatibility may incidentally coexist)
anti A or anti B in maternal serum may be hemolytic may resist neutralization by A and B substances no anti Rh in maternal serum (usually)	anti-Rh in maternal serum (hemolytic or neutralization-resistant anti A or anti B may incidentally coexist)
red blood cells of infant commonly spherocytic increased osmotic fragility reticulocytosis prominent generally negative Coombs test (80%) positive glue test*	red blood cells of infant little or no spherocytosis fragility normal reticulocytosis not marked positive Coombs test (99%) positive glue test*

*in A and B incompatibilities and in Rh incompatibility the red blood cells of the affected infant usually show spontaneous agglutination in certain colloidal media such as solutions of acacia or glue or adult serum

WHATEVER IT'S CAUSE

HYPERBILIRUBINEMIA MAY LEAD TO KERNICTERUS

Anemia is rarely a cause of death in hemolytic disease

In infants in good condition at birth only kernicterus is a

serious threat to recovery

In A and B incompatibility as in Rh incompatibility or in other

conditions leading to severe neonatal icterus the risk of

kernicterus is closely related to the level of serum bilirubin

EXCHANGE TRANSFUSION PREVENTS KERNICTERUS

IF HYPERBILIRUBINEMIA CAN BE CONTROLLED

Exchange transfusion is the only measure

of established effectiveness against kernicterus

We use exchange transfusion to maintain the level of serum bilirubin

below 20 mgm per 100 ml (or 15 mgm per 100 ml in prematures)

And we do multiple exchange transfusions

where necessary to achieve this and

As a result we do more exchange transfusions

for A or B incompatibility than for Rh incompatibility

At Temple University Hospital 1954 1956

16 of 26 infants with A or B isoimmunization
received a total of 22 exchange transfusions

12 of 18 infants with Rh isoimmunization
received a total of 18 exchange transfusions

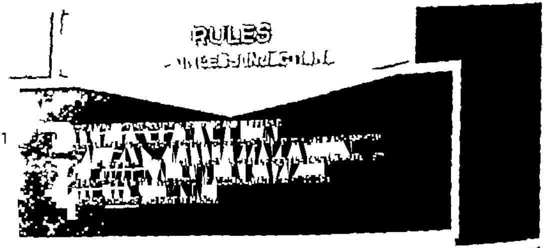
4 additional infants received exchange transfusions
for intense hyperbilirubinemia of uncertain cause

These studies were supported in part by grants from
the Mead Johnson Company and from the National Institutes of Health

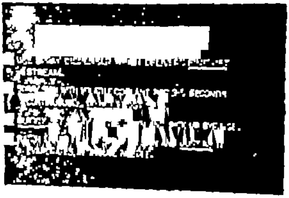
How to Give Painless Injections.

Virginia D Weeks and Janet Travell, the New York Hospital-Cornell Medical College New York.

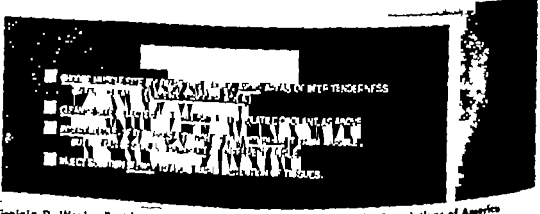
Rules are stated which enable one to give injections that are painless. The procedure makes use of two new principles: (1) production of cutaneous analgesia, by chilling the skin with volatile coolant like ethyl chloride without freezing the skin or inducing cold pain; in young children, spraying the skin directly often elicits a startle reaction, and this is avoided by holding a cotton ball wetted with the coolant against the skin (2) selection of a non-tender site in muscle in order not to hit a latent trigger area, whenever the intramuscular route is to be used. On examination, the myofascial trigger area is detected by deep tenderness and fasciculation. Electromyographically the trigger area suggests a myogenic discharging focus. The specific patterns of referred pain from trigger areas in muscles commonly used for injection are also shown. Technics for producing optimum cooling of the skin will be demonstrated.



1







1

Dr Virginia D Weeks Postdoctorate Fellow of the Muscular Dystrophy Associations of America

There was a Faith Healer from Deal
Who said "Although pain isn't real
When I sit on a pin
And it punctures the skin
I dislike what I fancy I feel"

OLD LIMERICK

Dread of "the needle" is usually acquired in childhood. Nowadays, few people attain adult age without immunizing injections, venipunctures or parenteral medication Conditioned reflexes develop early even in infancy Thus, psychologic trauma caused needlessly by injection pain may hamper doctor-patient relationships throughout life and render difficult the management of diagnostic and therapeutic problems.

We take exception to the popular notion that the jab of a needle must inevitably cause some pain. We have outlined simple rules which virtually insure painless injections, provided of course that the solution itself is not irritating

SKIN PAIN

Chilling the skin to just below 10 C. eliminates the pricking pain of a needle insertion

Ethyl Chloride Sprayed on Skin

Needle Insertion	Temperature of Skin Surface °C			
	Above 15	15 12	11 9° 10	Below 10
Number of Tests	20	19	18	31
Prick Perceived	67%	47%	33%	0%

Recorded at 3-second intervals by iron-constantan thermocouples, 8-channel Leeds and Northrup Speedomax.

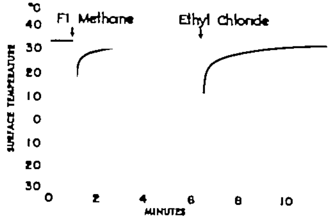
We achieve a level of cooling which of itself does not cause cold pain Excessive cold hurts more than the needle, and may cause frostbite (blistering), especially in infants and other persons with delicate skin

Satisfactory analgesia to a needle prick is obtained by briefly spraying the skin with a volatile coolant The skin must *not* be frosted or frozen. We use either ethyl chloride or a fluoromethane mixture (15% dichlorodifluoromethane and 85% trichloromonofluoromethane) The latter has advantages over ethyl chloride in that it is not flammable and has no general anesthetic action

These materials are sterile as dispensed. Ethyl chloride was supplied by the Gebauer Chemical Co. in a dispenser with calibrated "fine" nozzle. The fluoromethane mixture was supplied by the General Chemical Co. and for dispensing this spray a special nozzle was assembled and sterilized in the laboratory

These coolants do not sterilize the skin in the few seconds needed to chill it For injection the skin is therefore cleansed as usual before spray is applied.

SKIN SPRAYED DIRECTLY



Spray applied for 2 seconds through "fine" Gebauer nozzle Dispenser held 6 inches from skin Speedomax.



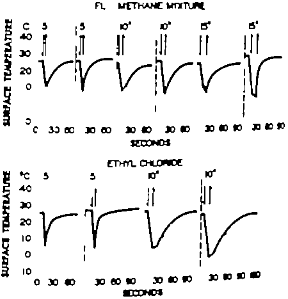
Direct spraying for 3-5 seconds produces brief cutaneous analgesia. Experience with a particular dispenser soon teaches one the optimum time and distance for spraying

Impact of spray (cold shock) may frighten young children.

Cotton ball sprayed generously with coolant and then applied lightly against skin eliminates startle reaction. Time required for analgesia is 5-10 seconds longer than for direct spraying

Fluffiness of cotton and light contact with skin admit air and favor evaporation thus shortening time of application necessary to block needle pain

COTTON BALL SPRAYED



Sterile cotton ball saturated with coolant and held against skin for 5-15 seconds. Speedomax.

Lowest dip in skin temperature occurs just as liquid film of coolant on skin is seen to dry Skin temperature remains below 10 C. for only 2-3 seconds so that needle must be inserted quickly Otherwise surface rewarms and analgesia is gone

Allergic responses (wheal flare and pseudopod formation) are not modified by such momentary chilling of skin The sprayed cotton ball is especially handy for intradermal testing with allergens since it retains coolant for several minutes and can be reused to chill skin for multiple injections given in rapid succession to the same patient

Likewise in pricking finger or ear for blood counts the cotton ball technic is convenient for blocking needle pain.

Pain of venipuncture can be largely eliminated by applying the coolant either directly or on cotton for a few seconds longer than is required to block skin pain.

Besides cotton we studied the sterile gauze pad as a vehicle for the volatile coolant

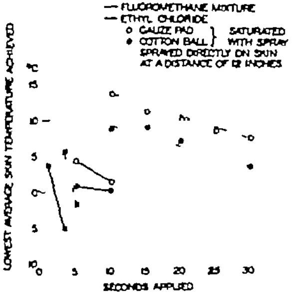
Each of the two coolants was applied by 1) direct spraying 2) cotton ball and 3) thin gauze pad 2 x 2 cm.

The gauze pad was least effective

For each method of application, the fluoromethane mixture cooled the skin a little more slowly than ethyl chloride but the difference is not of practical importance.

No cold pain resulted in any of these tests.

Variables in Effect of Coolants: Time and Mode of Application



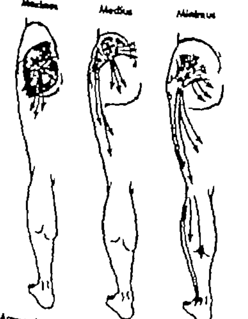
MUSCLE PAIN

Normal (non-tender) muscle is practically insensitive to movement of a needle

However most adults and many children have focal areas of deep muscle tenderness due to mechanical stresses of daily use even though there is no complaint of pain We regard these hyperalgesic foci as clinically latent trigger areas, since referred pain is set off by needle contact.

One objective sign of the presence of a trigger area is fasciculation of the tender muscle when it is rolled under the fingers. The examiner also learns to identify latent trigger areas by a localized change in consistency of the muscle which feels like induration but probably represents spasm

Common Location of Trigger Areas in Gluteal Muscles



Arrows show where immediate pain is felt if needle accidentally hits trigger area

To avoid hitting latent trigger areas a site is found for intramuscular injection where there is no deep tenderness and the muscle does not twitch when firmly palpated

Best muscles to use are those least prone to develop trigger areas: gluteus medius, upper part of gluteus maximus deltoid posteriorly and mid-part of rectus femoris. In infants, the gluteus medius anteriorly above the greater trochanter is particularly convenient since it is not necessary to turn the baby onto face or side to reach this. Also this area lies outside the diaper region

Long after an attack of bursitis or sciatica muscles in the affected extremity harbor trigger areas, and therefore should be avoided Injection into such latent trigger areas often reactivates the pain syndrome which then may last for months.

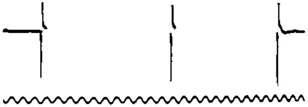
Studied electromyographically trigger areas in a resting muscle reveal high frequency repetitive discharges while at the same time adjacent sites in this muscle are electrically silent.

Action potentials from trigger area in trapezius muscle at rest

Amplitude of spikes is about 1000 microvolts, duration 1.3 milliseconds and frequency 10-12 per second

Calibration {100 microvolts, 10 milliseconds.

Coaxial needle electrode



SUMMARY

Rules for Painless Injection Use a non irritant solution isotonic and buffered. Test needle with sterile cotton just before use to be sure that it is sharp and smooth Choose region of body which never was seat of severe pain syndrome (bursitis, etc.) Cleanse skin with antiseptic; if alcohol wait for it to dry Prepare syringe and have it handy *Older Children and Adults.* Use spray dispenser which delivers fine jet stream Spray skin with volatile coolant continuously for 3-5 seconds; do *not* frost skin Quickly set spray bottle down and pick up syringe Watch liquid film of spray on skin and just as it dries, introduce needle quickly with skin taut *Young Children.* Spray a sterile fluffy cotton ball with volatile coolant until saturated Lightly hold wetted cotton against skin for 5-15 seconds depending on nature of coolant Remove cotton and at instant skin dries insert needle If several injections are given a patient same cotton ball is used as long as wet *Intramuscular Route* Choose muscle site by palpating deeply; avoid areas of deep tenderness and fasciculation (latent trigger areas) Cleanse site selected and chill skin with volatile coolant as above Insert needle; if it causes a twitch or pain withdraw it from muscle but not out of skin and reinsert at a different angle Inject solution slowly to avoid rapid distention of tissues.

Advantages of volatile coolants over sterile ice frozen zepharin cubes, cooling units and devices for speedy penetration of the skin are simplicity handiness rapidity of effect and low cost There is no need for refrigeration A bottle of spray can always be available in the office, hospital or medical bag, ready for immediate use

The cotton ball technic obviates the startle reaction which is a limiting factor in the use of cooling sprays to prevent needle pain in pediatric practice

ACKNOWLEDGMENTS

This investigation was aided by the Josiah Macy Jr Foundation the National Heart Institute of the National Institutes of Health Public Health Service (H493) and the Franz T Stone Fund of Cornell University

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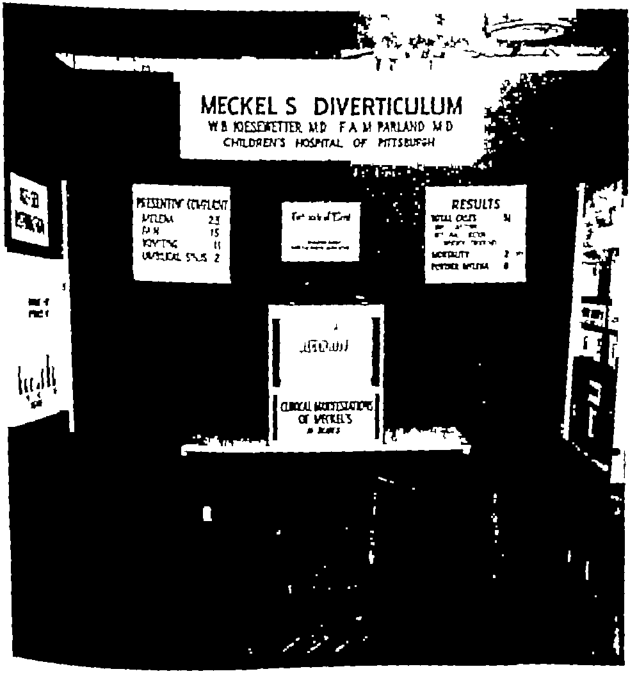
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Weeks, V D and Travell J Postural vertigo due to trigger areas in the sternocleidomastoid muscle. J. Pediat., 47:315 (Sept.) 1955.

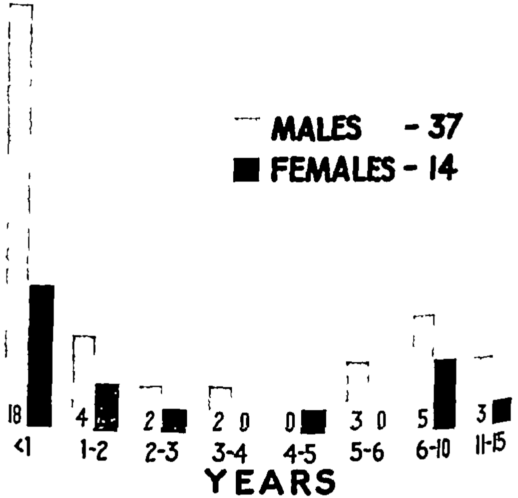
Certificate of Merit

Meckel's Diverticulum. W. B. Kiesewetter and F. A. McParland. Children's Hospital of Pittsburgh, Pittsburgh

The exhibit shows age and sex incidence, complaints in order of frequency, clinical manifestations, results of therapy in a se ies of 51 cases, and incidence of pathological lesions.



AGE-SEX DISTRIBUTION



CLINICAL TYPES OF MECKEL'S PATHOLOGY

1. ULCERATION
2. OBSTRUCTION
3. INFLAMMATION
4. UMBILICAL SINUS

CLINICAL MANIFESTATIONS OF MECKEL'S

16 SLIDES

PATHOLOGY

		
NORMAL	GASTRIC	MULTIPLE
16	25	5

UNKNOWN

5

PRESENTING COMPLAINT

MELENA	23
PAIN	15
VOMITING	11
UMBILICAL SINUS	2

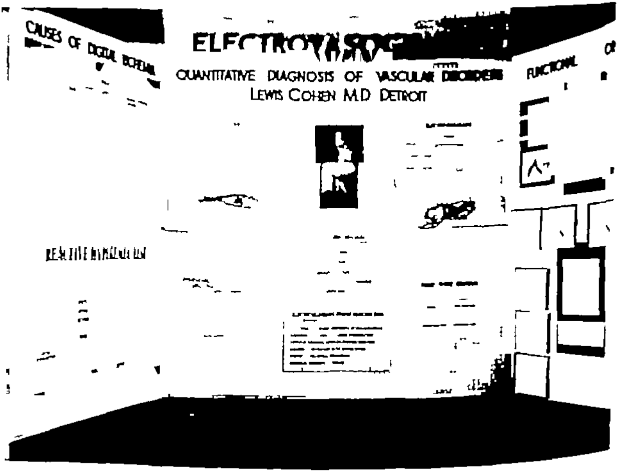
RESULTS

TOTAL CASES		**51**
DIVERTICULECTOMY	31	
INTESTINAL RESECTION	19	
NO TREATMENT (MORIBUND)	1	
MORTALITY		**2** (3.9%)
FURTHER MELENA		**0**

Certificate of Merit

Electrovasography: Quantitative Diagnosis in Vascular Disorders. Lewis Cohen Alexander Blain and Sinai Hospitals, Detroit

An electronic pneumo-plethysmograph provides quantitative data concerning functional and organic influences on digital (finger and toe) blood flow. Recorded measurements of volume pulsation, pulse wave contour and relative blood flow demonstrate (1) functional and organic components of vascular impairment (2) selection of patients for lumbar sympathectomy (3) extent of collateral circulation; (4) the effect of various therapeutic agents on peripheral flow, and (5) individual sensitivity to tobacco. The application of this diagnostic aid is shown in patients having arteriosclerosis obliterans, thromboangiitis obliterans, scleroderma, phlebitis, and amputations. It has proven to be relatively rapid, reliable, reproducible, and acceptable to the patient as an office or hospital procedure.



Acknowledgment is made to the following publishers for the use of illustrations: Grune and Stratton Williams and Wilkin Co C. V Mosby Co New England Journal of Medicine; to the Research Department Sinai Hospital of Detroit and to Travis Winsor M.D Inventor of the Vasograph.

ELECTROVASOGRAMS PROVIDE OBJECTIVE DATA

Concerning

1. EARLY DETECTION OF PERIPHERAL VASCULAR DISEASE
2. ANALYSIS OF ORGANIC AND FUNCTIONAL COMPONENTS OF PERIPHERAL ISCHEMIA
3. EFFECT OF THERAPEUTIC AGENTS ON PERIPHERAL BLOOD FLOW
4. LOCATION OF OBSTRUCTIONS IN THE ARTERIAL SYSTEM
5. EXTENT OF COLLATERAL CIRCULATION
6. INDIVIDUAL SENSITIVITY TO TOBACCO
7. PROGNOSIS FOR SYMPATHECTOMY

INDICATIONS

ARTERIOSCLEROSIS OBLITERANS
ATHEROSCLEROSIS
AMPUTATIONS
CERVICO BRACHIAL SYNDROMES
COLLAGEN DISEASES
DIABETES MELLITUS
PHLEBITIS
ARTERIAL EMBOLUS
SYMPATHETIC DYSTROPHY
RAYNAUD SYNDROME
CAUSALGIA
THROMBOANGIITIS OBLITERANS

CAUSES OF DIGITAL ISCHEMIA

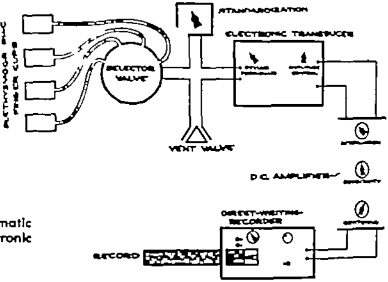
PRIMARILY OBSTRUCTIVE CAUSES OF DIGITAL ISCHEMIA

MAJOR ARTERIES	FINE VESSELS	BLOOD ADULTERATION	COLD SENSITIVITY & COLD EXPOSURE
[illegible]	[illegible]	[illegible]	RAYNAUD'S DISEASE
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]		

PRIMARILY FUNCTIONAL CAUSES OF DIGITAL ISCHEMIA

NERVOUS SYSTEM	REFLEX CONSTRICTION	METABOLIC CATABOLIC	HORMONAL	PHARMACOLOGIC
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]		[illegible]	
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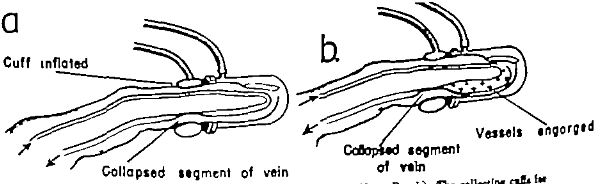
PROCEDURE



Schematic diagram of the pneumatic and electric components of the electronic pneumoplethysmograph.

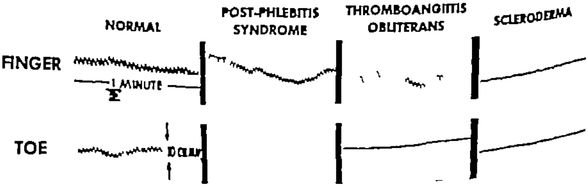
MEASUREMENTS

1. DIGITAL VOLUME PULSATION
2. LIMB SEGMENT PULSATION
3. PULSE WAVE CONTOUR
4. SYMPATHETIC ACTIVITY
5. SYSTOLIC BLOOD PRESSURE GRADIENTS OF THE EXTREMITIES
6. RELATIVE BLOOD FLOW IN TOES FINGERS, AND LIMB SEGMENTS

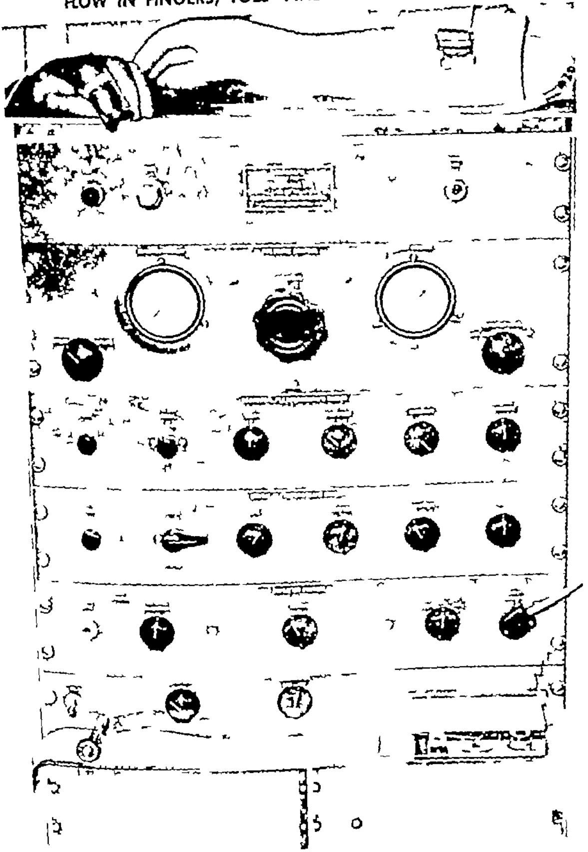


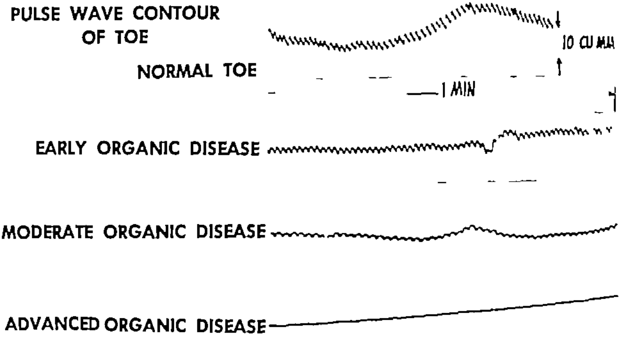
Digit enclosed in plastic air-sealed cup (from Burch) The collecting cuffs for venous occlusion are placed at the fingers or more generally t the wrists and ankles. Rapid inflation f these cuffs to level between venous and arterial diastolic pressure traps the arterial inflow The increase of the enclosed volume per unit of time is the relative blood flow

ELECTROVASOGRAMS



VASOGRAPH FOR RECORDING PULSATION AND BLOOD FLOW IN FINGERS, TOES AND IN LIMB SEGMENTS





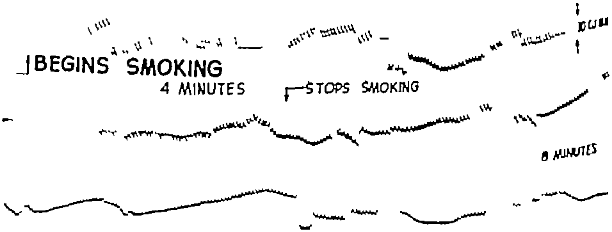
CRITERIA OF ORGANIC VASCULAR DISEASE

(as demonstrated by the toe volume pulsation)

1 THE APEX IS ROUNDED
2 THERE IS NO DICROTIC NOTCH
3 THE AMPLITUDE IS LESS THAN 3 CU MM.
4 THE AMPLITUDE IS LESS THAN 50% OF THE FINGER PULSE
5 THE CREST TIME IS GREATER THAN 30% OF THE PULSE WAVE

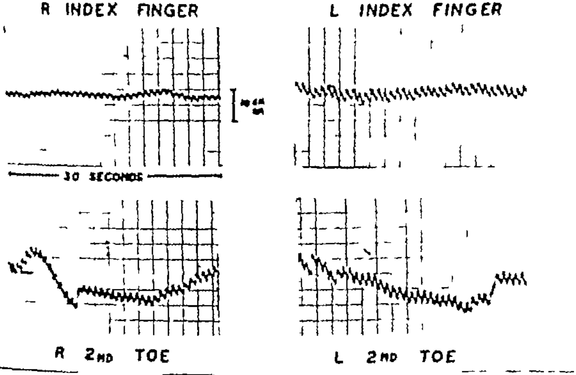
VASOCONSTRICTION DUE TO TOBACCO SENSITIVITY

ELECTRO-VASOGRAM - LEFT 2ND TOE

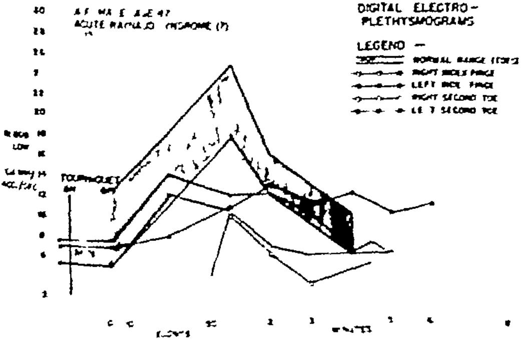


Plethysmographic studies of 40-year-old man with chronic thrombophlebitis showing peripheral vasoconstriction after he had smoked one and half cigarettes.

ORGANIC TYPE OF ELECTROVASOGRAM

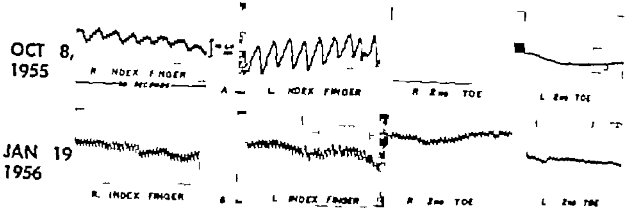


REACTIVE HYPEREMIA TEST

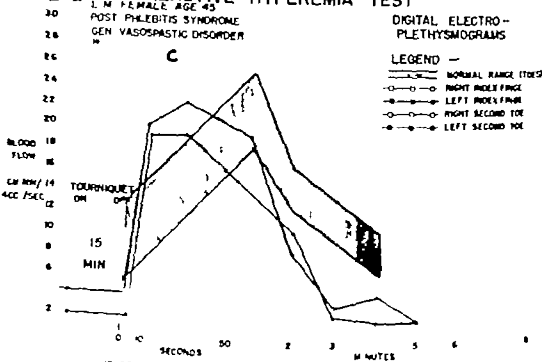


A.F. [illegible]

FUNCTIONAL TYPE OF ELECTROVASOGRAM



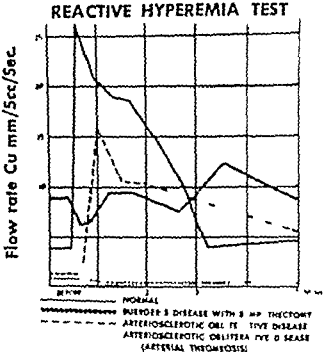
REACTIVE HYPEREMIA TEST



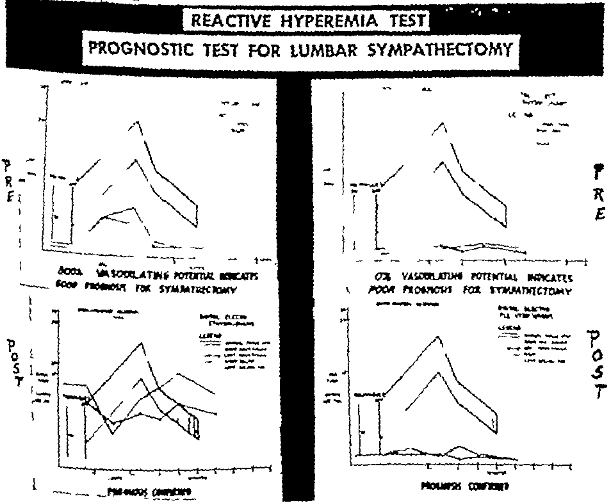
(L. M., female age 46) – A. Plethysmograms at rest (vasodilated) showing marked vasoconstriction of toes. Clinical diagnosis postphlebitis syndrome, left leg. B After bed rest and further vasodilatation with sublingual and intramuscular administration of Hydergine. C. Reactive hyperemia test, showing marked vasospastic reactivity and absence [illegible] organic involvement.

CIRCULATORY CHANGES FOLLOWING RELEASE OF 5 MINUTE ARTERIAL OCCLUSION AT THE ANKLE [illegible]

	NORMAL RANGE	ORGANIC DISEASE
RESTING BLOOD FLOW TO TOE (CU MM/4CC/SEC)	3-1	[illegible]
PERIOD OF CONSTANT TOE VOLUME (SEC.)	[illegible]	[illegible]
[illegible] BETWEEN RELEASE OF TOURNIQUET [illegible] MAXIMUM RATE OF BLOOD FLOW (SEC.)	[illegible]	[illegible]
MAXIMUM [illegible] OF BLOOD FLOW	19-25	[illegible]
[illegible] (% INCREASE)	200-1[illegible]	[illegible]
[illegible] AMPLITUDE	[illegible]	[illegible]

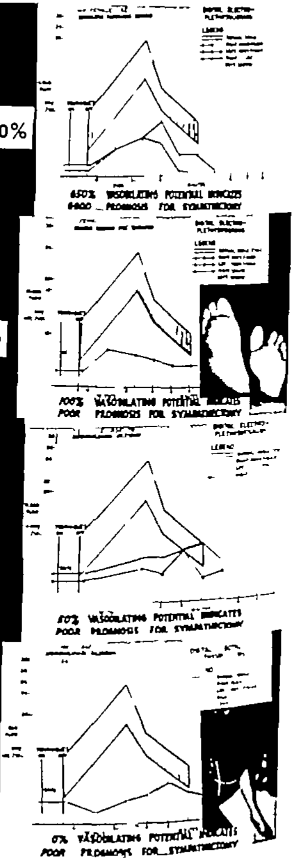


Reactive hyperemia curves (from Hood et al) Flow record in the toe after arterial occlusion shown by normal subject and patient with arteriosclerosis ablit erans and thromboangiitis bliterans. The diagnostic d is provided by these est are (1) The control values at rest, (2) The period of con tant toe volume following release of tourniquet, (3) The ma imum rat of blood flow and (4) The period of hyperemia.



CORRELATION BETWEEN VASODILATING POTENTIAL AND FUNCTIONAL ARTERIOSPASM AS A PROGNOSIS FOR LUMBAR SYMPATHECTOMY

DEGREE OF FUNCTIONAL ARTERIOSPASM	VASODILATING POTENTIAL (% INCREASE OVER RESTING FLOW)
INTENSE	400 to 1800%
STRONG	100 to 400%
WEAK	20 to 100%
NONE	0 to —50%



Rehabilitation of the Poliomyelitis Patient with Respiratory Paralysis. Leon Lewis, Gerald G Hirschberg, and J P Adamson, Poliomyelitis Respiratory and Rehabilitation Center Fairmont Hospital San Leandro Calif

The exhibit shows (1) respiratory devices needed for the acute poliomyelitis patient; (2) how a patient with the most severe respiratory paralysis is able to undergo a regular rehabilitation program by judicious use of respiratory aids and need not be confined to bed until his respiratory capacity improves; and (3) problems of permanent care of the respiratory poliomyelitis patient after maximum respiratory rehabilitation has been achieved and interesting facts on the difference of respiratory function in upright and lying positions. The syndromes of hypoxia and hyposthenuria are also illustrated

ADEQUATE VENTILATION DURING ACUTE PHASE

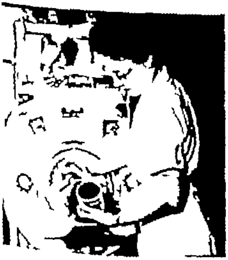
1 SAVES LIFE.
2. PREVENTS HYPOXIA AND HYPERCAPNIA.
3. PROBABLY LIMITS DAMAGE TO C. N S.

ADEQUATE VENTILATION IS DETERMINED BY:

CLINICAL OBSERVATION
RESPIROMETRY
CHEMICAL TESTS.

ADEQUATE VENTILATION IS ACCOMPLISHED BY

USE OF MECHANICAL RESPIRATORS
AN UNOBSTRUCTED AIR WAY

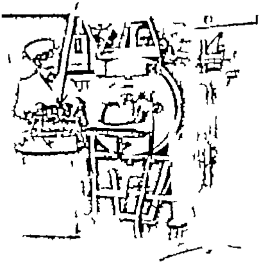




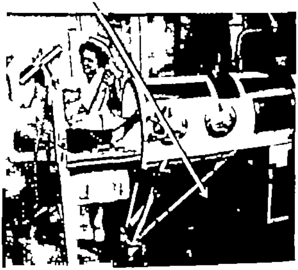
Respiratory air flow is measured by ventilometer or [illegible] compared with predicted normal value; tank pressure is [illegible] flow

MECHANICAL RESPIRATOR

MECHANICAL RESPIRATION IS ACHIEVED BY NEGATIVE OR POSITIVE PRESSURE. IT MUST BE STARTED LONG BEFORE THE PATIENT IS IN RESPIRATORY DISTRESS (AT 50 30% OF PREDICTED VITAL CAPACITY) IT MUST BE UNINTERRUPTED THROUGH ACUTE PHASE.

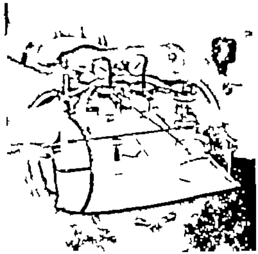


Tank respirator and accessories for acute phase respiration.



Tank respirator open for nursing care. Patient respired by positive pressure.

A FREE AIR WAY IS MAINTAINED BY HUMIDIFICATION OF THE BRONCHIAL MUCOSA AND NON TRAUMATIC ASPIRATION OF SECRETIONS



Use of Y tube and proper pressure (10 in. Hg) prevent damage to mucosa.



Aerosolized air prevents bronchial plugging and drying.

REHABILITATION PHASE

WITH ADEQUATE VENTILATION THE PATIENT WITH RESPIRATORY HANDICAP CAN FOLLOW A STRENUOUS EXERCISE PROGRAM.

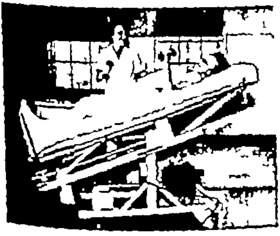
WITH APPROPRIATE BREATHING ASSISTANCE THE RESPIRATORY PATIENT CAN BE TREATED WITH THE SAME MODALITIES AND NEARLY AS INTENSIVELY AS THE NON RESPIRATORY PATIENT

METHODS OF RESPIRATORY ASSISTANCE DURING EXERCISE:

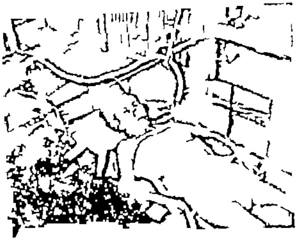
1. Rocking bed.
2. Positive pressure
3. Chest cuirass
4. Abdominal respiratory assistor
5. Glossopharyngeal breathing



Mat group therapy of respiratory patients. The patient in the center is assisted by glossopharyngeal breathing.



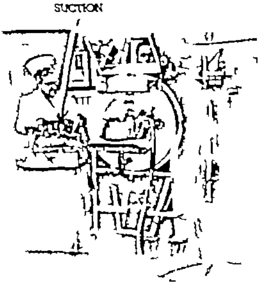
Dumbbell exercises can be carried out while the rocking bed is in motion.



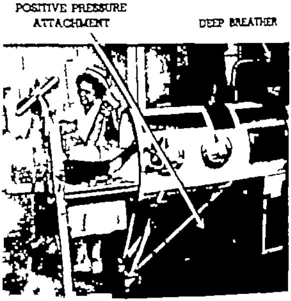
Patient in Hubbard Tub assisted by positive pressure.

MECHANICAL RESPIRATOR

MECHANICAL RESPIRATION IS ACHIEVED BY NEGATIVE OR POSITIVE PRESSURE. IT MUST BE STARTED LONG BEFORE THE PATIENT IS IN RESPIRATORY DISTRESS (AT 50 30% OF PREDICTED VITAL CAPACITY) IT MUST BE UNINTERRUPTED THROUGH ACUTE PHASE.

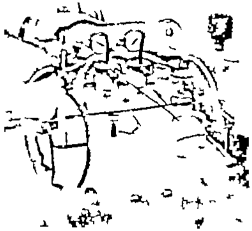


Tank respirator and accessories for acute phase respiration.



Tank respirator open for nursing care. Patient respired by positive pressure.

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Use of Y tube and proper pressure (10 in. Hg) prevent damage to mucosa.



Aerosolized air prevents bronchial plugging and drying.

REHABILITATION PHASE

WITH ADEQUATE VENTILATION THE PATIENT WITH RESPIRATORY HANDICAP CAN FOLLOW A STRENUOUS EXERCISE PROGRAM.

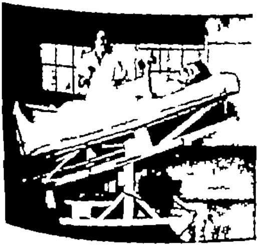
WITH APPROPRIATE BREATHING ASSISTANCE THE RESPIRA TORY PATIENT CAN BE TREATED WITH THE SAME MODALITIES AND NEARLY AS INTENSIVELY AS THE NON RESPIRATORY PATIENT

METHODS OF RESPIRATORY ASSISTANCE DURING EXERCISE.

1. Rocking bed.
2. Positive pressure
3. Chest cuirass
4. Abdominal respiratory assistor
5. Glossopharyngeal breathing



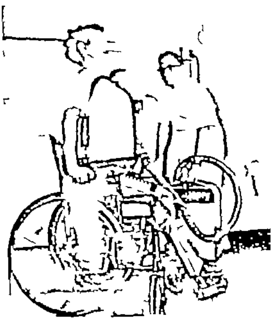
Mat group therapy of respiratory patients. The patient in the center is assisted by glossopharyngeal breathing.



Pedal exercises can be carried out while the rocking bed is in motion.



Patient in Hubbard Tub assisted by positive pressure.



Wheel chair exercise for the paraplegic and respiratory poliomyelitis patient.



Occupational therapy combined with tilt table. Standing period is made feasible by use of chest cuirass.



Gait training in parallel bars with positive pressure breathing assistance

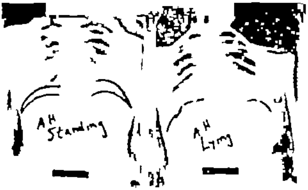


Patients on stairs with positive pressure and cuirass.

SUPERIMPOSED X RAYS OF DIAPHRAGMATIC POSITIONS ON MAXIMAL EXPIRATION AND INSPIRATION INDICATE EXTENT OF TOTAL DIAPHRAGMATIC EXCURSION



Patient G. S. is adequately ventilated in lying position (V. C. 1200 cc.).
In upright position her V. C. drops to 780 cc. without corset and 800 cc. with corset. During strenuous activity in upright position she needs respiratory assistance.



Patient A. H. can be on her feet all day without respiratory aid (V. C. 1100 cc.).
In lying position her V. C. falls to 600 cc. and she needs respiratory assistance. She sleeps on a rocking bed.



Ambulation respiratory assistance with respirator



Training in wheel chair activities. Respiratory assistance given by respirator

CHRONIC PHASE

ADEQUATE VENTILATION

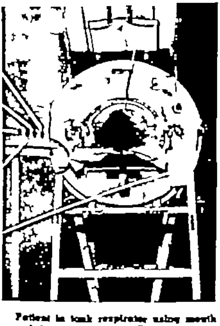
ASSURES MAXIMUM FUNCTION
AVOIDS COMPLICATIONS DUE TO CHRONIC HYPOXIA.
LIMITS STRESS REACTIONS.

RESPIRATORY AID MAY BE NEEDED

CONTINUOUSLY THROUGHOUT LIFE.
AT REGULAR INTERVALS
FOR SPECIFIC POSITIONS OR TASKS
FOR MEDICAL COMPLICATIONS

THE WITHDRAWAL OF RESPIRATORY AID IS NOT THE PRIMARY GOAL OF REHABILITATION

The mere fact that the patient can live and breathe without respiratory assistance is no indication of adequate ventilation. The need for respiratory assistance must be appraised by accurate measurement.



Patient in tank respirator using mouth wand for page turning. Drinking water bottle and multicontroller switch afford greater independence



Same patient out of tank respirator learning bookkeeping.

The patient who needs uninterrupted respiratory assistance is capable of useful and vocational activity There is no need for such patients to remain in a tank respirator at all times.

ADEQUATE VENTILATION TO PREVENT COMPLICATIONS



Total Atelectasis left lung requiring temporary resumption of respirator care after period of complete respiratory self sufficiency

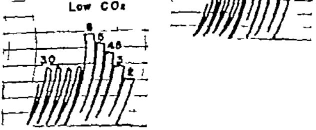


Patient S. G. had delivery on tray of tank respirator. Respired in tank respirator during labor and following delivery. Breech extraction performed with artificial respiration by positive pressure.

The direct writing CO_2 analyzer indicates the concentration of CO_2 in expired air The peak of the curve corresponds to alveolar CO_2 Blood O_2 and CO_2 concentrations and pH are determined in the laboratory



Infrared CO_2 analyzer indicates alveolar CO_2 concentration.



HYPOSTHENURIC SYNDROME OF POST ACUTE POLIOMYELITIS

Dr C W Daeschner & Dr W A Spencer Southwestern Poliomyelitis Respiratory Center Houston, Texas

Of 250 severe respiratory paralytics 3.2% (age range 12-20 years) developed syndrome characterized by:

MANIFESTATIONS

- Hirsutism and acne
- Abdominal distention
- Anorexia, nausea and vomiting
- Extensive weight loss
- Hypertension
- Polyuria and Polydypsia
- Inability to concentrate the urine.
- Elevated serum BUN and Ca.
- Elevated urinary 17 keto-steroids.
- Low serum K, resistant to replacement therapy

ETIOLOGICAL FACTORS

- Adolescence
- Osteoporosis of immobilization-hypercalcuria.
- "Stress
- Inadequate ventilation
- Excessive precipitate weaning from respirator
- Nausea and vomiting—potassium loss.



DIAGNOSIS OF CHRONIC HYPOXIA

CLINICAL SIGNS

1. Lethargy
2. Mild cyanosis.
3. Loss of weight and appetite
4. Acne of face and trunk.
5. Arterial hypertension.
6. Decreased vital capacity

LABORATORY DATA

1. Increased hemoglobin.
2. Increased arterial pCO_2
3. Decreased arterial oxygen saturation
4. Respiratory acidosis.
5. Increased pulmonary artery pressure

REVERSAL OF SYNDROME OF CHRONIC HYPOXIA BY ADEQUATE VENTILATION

PATIENT E. R., Age 16

February 1953:—Onset of Polio
3 months full time tank respirator — gradual decrease of respiratory aid.

March-June 1953:
"Weaning program variable but diminishing respiratory aids.

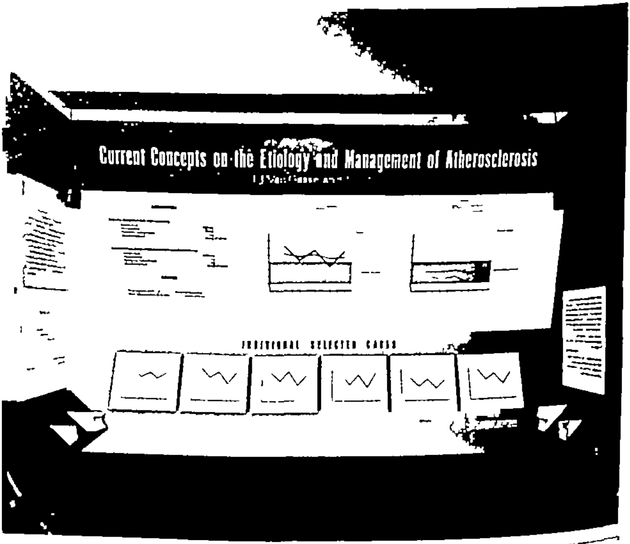
October 1954:
Home care program. Chest cuirass respirator for night use No respiratory assistance during the day

Maximum G P breath: 2000 cc.

ON ADMISSION TO CENTER (9-1 55)		AFTER TEN WEEKS OF APPROPRIATE RESPIRATORY ASSISTANCE	
Clinical Picture			
Marked acne		Mild clearing acne	
Cyanosis		No cyanosis	
Lethargy unable to concentrate		Alert, interested resumed educational activity	
Vital capacity	375 ml.	Vital capacity	620 ml.
Minute volume	3.0 L min.	Minute volume	4.5 L min.
Maximal glossopharyngeal breath	765 ml.	Maximal glossopharyngeal breath	2000 ml.
Laboratory Data			
Hemoglobin	17 9 gms.	Hemoglobin	15 7 gms.
Arterial O_2 saturation	80.3 %	Arterial O_2 saturation	86.0 %
pCO_2	76 mm.	p CO	55 mm.
Pulmonary artery pressure (at rest)	42 20 (mean 30.3)	Pulmonary artery pressure (at rest)	27 8 (mean 16)

Current Concepts on the Etiology and Management of Atherosclerosis. J J Van Gasse and R. F Miller Jackson Mich.

Some of the recent theories concerning the etiology of atherosclerosis are outlined The exhibit includes a review of 32 cases studied by the authors in an effort to determine the effect of unsaturated fatty acids on elevated and normal serum cholesterol levels. Schematic presentation of the development of atherosclerotic plaques and brief discussion of the effect of various prophylactic measures on elevated serum cholesterol levels is also presented



Although atherosclerosis is by no means a new problem, there are some indications that it is becoming more prevalent among younger age groups. There has been considerable controversy over the etiology of atherosclerosis and coronary heart disease and the answers have by no means yet been found.

There is an ever increasing amount of evidence well documented in the literature which indicates that excessive consumption of fats and elevated serum cholesterol levels are involved in the pathologic processes. Mortality figures at the present time indicate that coronary heart disease is the leading cause of death in the United States. It has been reported that approximately ninety per cent of coronary thrombosis are caused by atherosclerosis. Pathologists have frequently reported that virtually all Americans autopsied beyond childhood show varying degrees of atherosclerotic changes. It is interesting to find that other population groups appear to have even higher incidence of atherosclerosis than seen in the United States, while in other areas of the world the condition is extremely rare.

Keys has done some interesting work in this respect and has found striking differences between the Bantu and European populations of Cape Town, South Africa. The Bantu's diet contains 17 per cent of total calorie value of fat, whereas the European population of this same city averages a diet of 40 per cent fat. The Bantu serum cholesterol level on the average is found to be 168.5 mg per cent, while the European level averages at 211.8 mg per cent.

Other studies of similar nature have indicated that populations with high serum cholesterol levels, in general, have a high incidence of atherosclerosis. Populations with low serum cholesterol levels have a low incidence of atherosclerosis. It is well known that certain groups of patients, such as diabetics and those with nephrosis or hypothyroidism, have high serum cholesterol levels and are likewise afflicted with a high incidence of atherosclerosis and coronary heart disease. Many authors have pointed out that the relationship is unlikely to be as direct as it might appear but the fact that there seems to be some relationship is conceded by almost everyone.

Considerable experimentation has been done in an effort to determine ways in which serum cholesterol levels could be lowered. It has been pointed out that the type of fat ingested makes a difference in serum cholesterol levels. Population groups eating a diet high in animal fats and hydrogenated vegetable oils are found to have high serum cholesterol levels, whereas groups eating marine or fish oils and natural vegetable oils exhibit lower cholesterol levels. A primary difference between the two types of fat lies in the concentration of unsaturated fatty acids. It has been postulated that the unsaturated fatty acids in some way lower the serum cholesterol values. The exact mechanism has not been defined.

Other methods for lowering the serum cholesterol have been proposed. They include use of female hormones, and the use of sitosterols which are said to block the absorption of cholesterol present not only in the diet, but in the intestine as well. The literature contains reports on the use of sitosterols, some of which are favorable and others inconclusive.

Perhaps one of the simplest and most direct methods of reducing serum cholesterol is by cutting down on the amount of fat ingested. The average American diet today contains close to forty per cent of its total calories as fat and it would appear on this basis that there is room for reducing the fat content of our diet. But we must remember that eating habits are difficult to change once they have been permanently fixed and, rather than expecting immediate response to such a campaign, the best we could hope for would be a long range educational program for the American people.

The present study of 32 patients was designed in an effort to determine the effect of an unsaturated fatty acid upon serum cholesterol levels. In all, 32 patients were followed over a period of three to four months. One group of nine patients, including two female subjects, was composed of healthy adults between the ages of 25 and 45. A series of ten patients, who had diagnosed coronary heart disease and who ranged in age from 25 to 50 made up the second segment of the study population. The third separate group was composed of thirteen clinically well students between the ages of 20 and 28.

Although a large number of other individuals have been in the study in the last few weeks, they will not be included in this preliminary report because of insufficient data on them at this time.

It should be pointed out at the beginning that at no time was any effort made to control the diet for the patients in any of the three groups. They were encouraged to eat what they would normally have eaten and, insofar as we are able to tell, they all did so.

In all cases we attempted to obtain a firm base line of serum cholesterol levels with three or more determinations on each individual prior to the use of any medication. Following the establishment of a base line, medication was begun and serum cholesterol determinations made weekly thereafter until termination of the study. All determinations were made by the two participating laboratories, using the same methods throughout. Cross checking of samples between the laboratories indicated that the results obtained were within the limits of normal and usual laboratory or human error.

The medication administered to the patients was labeled, for purpose of identification, A-9 and C-5. A 9 contained the following

Linoleic acid	700 mg
Nicotinic acid	25 mg
Pyridoxine hydrochloride	2 mg.
Mixed tocopherol	10 mg. (7.45 IU)

This mixture was quite thin and was prepared as a capsule. C-5 contained the same ingredients, but was prepared as a liquid emulsion with coconut flavor so that each tablespoon contained 4.1 grams of linoleic acid, 25 mg. nicotinic acid, 2 mg. pyridoxine hydrochloride, and 10 mg. mixed tocopherol.

A 9 was administered to the patients at a dosage of three capsules t.i.d., and thus received 6.3 grams of linoleic acid daily. The patients receiving C-5 were given three tablespoonfuls daily and received roughly twelve grams of linoleic acid.

All patients were placed on A 9 initially for a period of time from five to nine weeks. Twenty six of them then received the emulsion C-5. Throughout the study serum cholesterol levels were determined weekly to determine their rise or fall.

Before going into a summary of the data, some definitions are needed. We felt that a significant drop in serum cholesterol could be claimed only if there had been a reduction of ten per cent or more from the base line.

TABLE I

Drug	Patients Receiving Drug	Per Cent Reduction Serum Cholesterol Levels		
		0-9	10-19	20 or over
A 9	32	16	12	4
C-5	26	7	8	11

An analysis of the figures in Table I indicates that slightly over a half (16 out of 30) of the patients in this group showed only a slight reduction in serum cholesterol levels on the dosage (3 capsules three times a day) employed for A 9. Although at first glance this figure appears disappointing, a breakdown of other figures later might indicate otherwise.

Twelve of the patients on A 9 showed what we felt to be highly significant response with a 10-19 per cent reduction in serum cholesterol. Four others showed even a greater response with a drop of more than 20 per cent from the base line determination.

Response to the emulsion C-5 dosage was more clear-cut and quite likely is due to the higher concentration of linoleic acid which could be ingested in this way. Only seven of this group showed responses of less than ten per cent reduction in serum cholesterol, while the other 19 were, by our definition, significant responses. Eleven of these showed reductions of over twenty per cent.

It should be noted that 14 of the 26 patients taking C-5 objected to its taste and had to be strongly encouraged to continue medication. The taste was one factor that the patient group was kept on the drug for a relatively short period of time.

The principal difficulty with formula A 9 was occasional flushing and continuous itching on the part of 12 out of 32 of the patient group. Surprisingly only four of the patients on C-5 complained of similar symptoms. No other adverse side effects were noted and there was no cha ge in hematological studies, including clotting and bleeding times among the patient group. No after taste was reported from the capsule.

A further breakdown of the clinical data reveals some interesting information. A review of the individual case reports will indicate that only ten of the patients had evidence of cardiovascular disease. All of these patients received both A 9 and C-5, and if we arbitrarily define a significant response in being one in which there is a ten per cent or more reduction in serum cholesterol levels, we find that seven of the ten patients in this group could be classified as showing such a significant response. This means that in our study 67 per cent of patients with cardiovascular disease were able to achieve a significant reduction in serum cholesterol levels on both A 9 and C-5.

A number of authorities feel that this is desirable and quite likely important to patients recovering from myocardial infarctions or suffering from angina. On the other hand, 21 patients showing no evidence of disease received A 9 and only eight achieved a reduction of ten per cent or more in their serum cholesterol levels. Fifteen well patients receiving C-5 faired somewhat better and ten of them obtained a significant response.

A breakdown of the figures in a slightly different fashion is also revealing. Of the 32 patients receiving A-9, 15 of them had base line cholesterol levels which were considered "normal" by the standards and methods used in our laboratory. Such a normal range was considered to be 150 mg. to 225 mg. per cent. Abnormal, or "high" levels, were those above 225 and seventeen of the patients receiving A-9 were in this category. Twenty-four patients on C-5 were likewise divided between normal and high levels. Table II shows the response of these patients.

TABLE II

Drug	No. Patients with Normal Levels	No. Patients 10% or More Response	No. Patients with High Levels	No. Patients 10% or More Response
A-9	15	4	17	12
C-5	12	7	14	11

As you can see, only about one in four patients with normal cholesterol levels showed a significant response to A-9, while seven of twelve responded to C-5. However, in those patients with high serum cholesterol levels and in whom it did seem desirable to obtain a reduction, 71 per cent showed a significant response to A-9 and 80 per cent to C-5. This is a relatively small group of patients, although when working in a field involving case follow-up and numerous laboratory studies, the group is certainly not insignificant.

SUMMARY:

Thirty two patients were administered formula A-9 and C-5 containing linoleic acid, nicotinic acid, pyridoxine hydrochloride and mixed tocopherol. Of 17 people with high serum cholesterol levels (about 225 mg. per cent), twelve or 71 per cent of them, were found to have serum cholesterol levels reduced more than ten per cent on a dosage of three capsules three times a day.

The drug appeared capable of maintaining the reduction during the course of the study which was over a sixteen week period. Of 14 patients with high cholesterol levels who received the emulsion C-5, 11 of them (80 per cent) achieved a reduction of ten per cent or more.

The increased effectiveness of this dosage form may be accounted for by its greater concentration of unsaturated fatty acid (linoleic). In addition, 4 of 15 patients with so-called "normal" cholesterol levels showed a significant reduction in those levels when on A-9 and 7 of 12 showed a similar effect on C-5. When the drug was stopped, serum cholesterol levels promptly rose toward their base line once again.

Two of the patients were extremely interesting and both are similar in that prior to the use of medication, they had reported severe angina pectoris. They experienced marked relief from chest pain while on medication, and both of them were found to have substantially lower serum cholesterol levels during the course of therapy.

It appeared possible to achieve a reduction of serum cholesterol levels in a substantial number of patients with hypercholesterolemia using the unsaturated fatty acid formula. In the light of our present knowledge, such a reduction in cholesterol levels appears desirable and the use of such a formulation would seem indicated and advisable in at least two groups of patients:

1. Those with high cholesterol levels following diagnosed coronary thrombosis or who are known to have angina pectoris.
2. Those clinically well, but with a persistently elevated serum cholesterol level.

The medication administered to the patients was labeled, for purpose of identification, A-9 and C-5 A-9 contained the following

Linoleic acid	700 mg
Nicotinic acid	25 mg
Pyridoxine hydrochloride	2 mg
Mixed tocopherol	10 mg (7 45 IU)

This mixture was quite thin and was prepared as a capsule. C-5 contained the same ingredients, but was prepared as a liquid emulsion with coconut flavor so that each tablespoon contained 4 1 grams of linoleic acid, 25 mg nicotinic acid, 2 mg pyridoxine hydrochloride, and 10 mg mixed tocopherol.

A 9 was administered to the patients at a dosage of three capsules t.i.d., and thus received 6.3 grams of linoleic acid daily The patients receiving C-5 were given three tablespoonfuls daily and received roughly twelve grams of linoleic acid

All patients were placed on A 9 initially for a period of time from five to nine weeks. Twenty six of them then received the emulsion C-5 Throughout the study serum cholesterol levels were determined weekly to determine their rise or fall

Before going into a summary of the data, some definitions are needed. We felt that a sig nificant" drop in serum cholesterol could be claimed only if there had been a reduction of ten per cent or more from the base line.

TABLE I

Drug	Patients Receiving Drug	Per Cent Reduction Serum Cholesterol Levels		
		0-9	10-19	20 or over
A 9	32	16	12	4
C-5	26	7	8	11

An analysis of the figures in Table I indicates that slightly over a half (16 out of 30) of the patients in this group showed only a slight reduction in serum cholesterol levels on the dosage (3 capsules three times a day) employed for A 9 Although at first glance this figure appears disappointing, a breakdown of other figures later might indicate otherwise.

Twelve of the patients on A 9 showed what we felt to be highly significant response with a 10-19 per cent reduction in serum cholesterol. Four others showed even a greater response with a drop of more than 20 per cent from the base line determination.

Response to the emulsion C-5 dosage was more clear-cut and quite likely is due to the h gher concentration of linoleic acid which could be ingested in this way Only seven of this group showed responses of less than ten per cent reduction in serum cholesterol, while the other 19 were, by our definition, significant responses. Eleven of these showed reductions of over twenty per cent.

It should be noted that 14 of the 26 patients taking C-5 objected to its taste and had to be strongly encouraged to continue medication. The taste was one factor that the patient group was kept on the drug for a relatively short period of time.

The principal difficulty with formula A 9 was occasional flushing and continuous itching on the part of 12 out of 32 of the patient group. Surprisingly only four of the patients on C-5 complained of similar symptoms. No other adverse side effects were noted and there was no change in hematological studies, including clotting and bleeding times among the patient group. No after taste was reported from the capsule

A further breakdown of the clinical data reveals some interesting information. A review of the individual case reports will indicate that only ten of the patients had evidence of cardiovascular disease All of these patients received both A 9 and C-5 and if we arbitrarily define a significant response in being one in which there is a ten per cent or more reduction in serum cholesterol levels, we find that seven of the ten patients in this group could be classified as showing such a s gnificant response This means that in our study 67 per cent of patients with ardiovascula disease were able to achieve a significant reduction in serum cholesterol levels on both A 9 and C-5

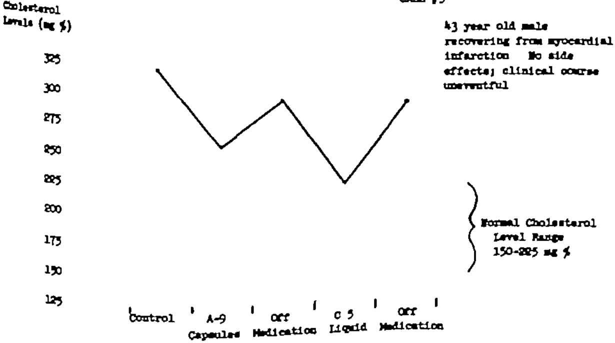
A number of authorit es feel that this is desirable and quite likely important to patients recovering from myocardial infarctions or suffering from angina. On the other hand, 21 patients sh wing no ev dence of disease received A 9 and only eight achieved a reduction of ten per cent or more in their serum cholesterol levels. Fifteen well patients receiving C-5 fared somewhat better and ten of them obtained a significant response

CASE #1



3-4 MONTH MEAN DETERMINATION OF SERUM CHOLESTEROL LEVELS

CASE #3



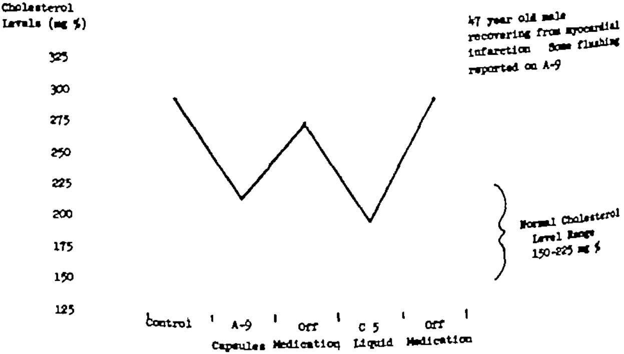
3-4 MONTH MEAN DETERMINATION OF SERUM CHOLESTEROL LEVELS

CASE #9



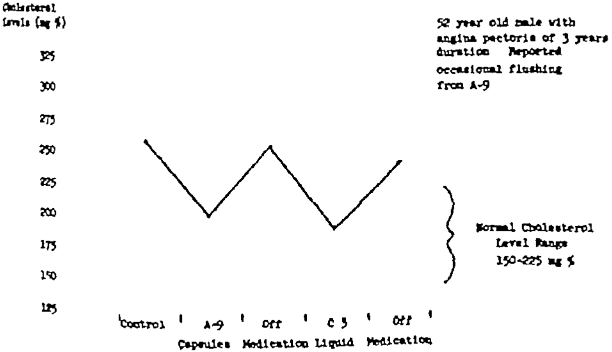
3-4 MONTH MEAN DETERMINATION OF SERUM CHOLESTEROL LEVELS

CASE #14



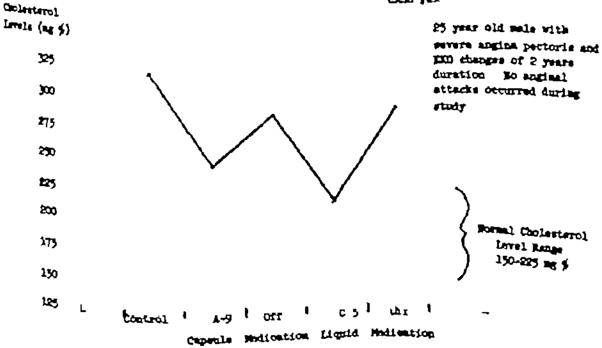
3-4 MONTH MEAN DETERMINATION OF SERUM CHOLESTEROL LEVELS

CASE #18



3-4 MONTH MEAN DETERMINATION OF SERUM CHOLESTEROL LEVELS

CASE #21



3-4 MONTH MEAN DETERMINATION OF SERUM CHOLESTEROL LEVELS

Certificate of Merit

Pneumoconiosis in the Diatomite Industry W Clark Cooper and Lewis J Cralley Occupational Health Program U S Public Health Service, Cincinnati

The exhibit summarizes the principal radiographic, pathologic and clinical findings in cases of pneumoconiosis found in workers in the diatomite processing industry and insofar as possible it correlates these with types of environmental dust and outlines control measures. It is based on an environmental and medical study of major diatomite producing plants in the United States carried out by the Occupational Health Program, Public Health Service U S Department of Health Education, and Welfare, in cooperation with State health agencies.



Diatomite is composed of the skeletons of microscopic plants diatoms that sank to the bottom of the seas which covered the Western United States millions of years ago It is essentially amorphous silica or opaline When the waters receded, millions of years of rain leached out soluble material so that the commercial deposits of diatomite, found in California Nevada Oregon and Washington often run more than 90 per cent silica

Research has found new uses for diatomite as filter aids in industry for swimming pool or small drinking water filtration plants as fillers for paper cement soap and plastics as paint flatteners and for high temperature insulation for industrial furnaces and kilns

About 400,000 tons of diatomite are mined yearly and production is increasing

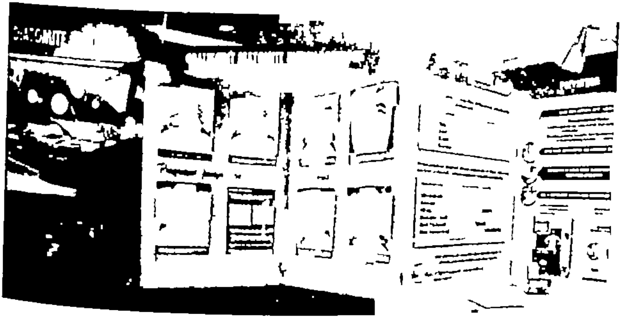
Evidence that diatomite could cause a pneumoconiosis led to a

study of the industry in 1953 and 1954 by the Occupational Health Program of the U S Public Health Service and the Health Departments of California, Nevada, Oregon and Washington

Diagonite is mined from open pits (Panel 5) using heavy power shovels and earth-moving equipment The crude material is dried and refined to produce the natural powder with a minimum of crushing of the individual delicate diatoms

Depending upon its intended use, the refined raw product is roasted at about 1900 degrees F (high temperature straight-calcined) or roasted at about 2000 degrees F with a flux (flux-calcined)

The diatomite then is bagged for loading into trucks or freight cars

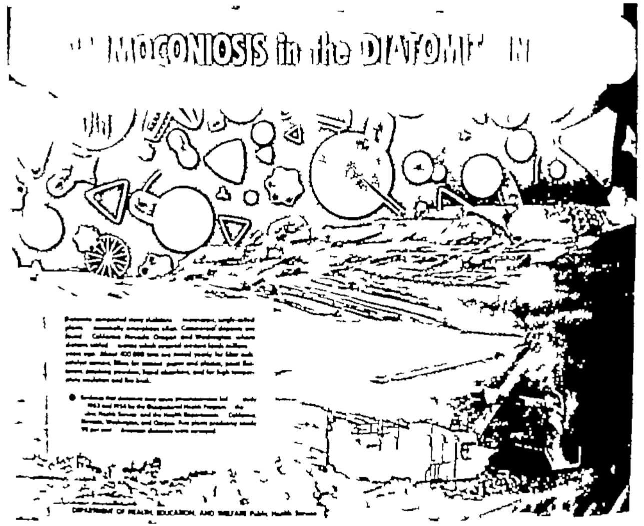


In the two-year survey a total of 1 562 samples of dust were collected Of these 1,160 were impinger samples for determining atmospheric concentrations The remainder were special samples taken to find the physical and chemical composition of the materials collected

Analysis of the material with X-ray diffraction apparatus showed that the diatomite in its crude state was almost 100 per cent non-crystalline But when the material was subjected to either high temperature straight calcining or to flux calcining some of the silica converted to cristobalite a sub-microscopic cube-shaped crystal

After straight calcining at high temperature the product was found to be about 17 percent cristobalite Flux calcined diatomite was about 55 per cent cristobalite

Electron micrographs show the structure of the natural diatomite



PANEL 6

and the changes that take place under calcining The X-ray diffraction patterns show how the crystals diffract the X-ray beam setting up characteristic interference lines The density of the lines are in direct proportion to the per cent of crystals in the sample

Average air borne particle size for diatomite is about 1 micron

Chest films were made of 869 men and women 93 per cent of those employed in the five plants In addition to chest films histories were obtained and physical examinations were completed on 84 per cent of the workers

Panels 1 and 2 show the non-medical aspects of the study the contributions of the chemist, physicist, engineer and industrial hygienist

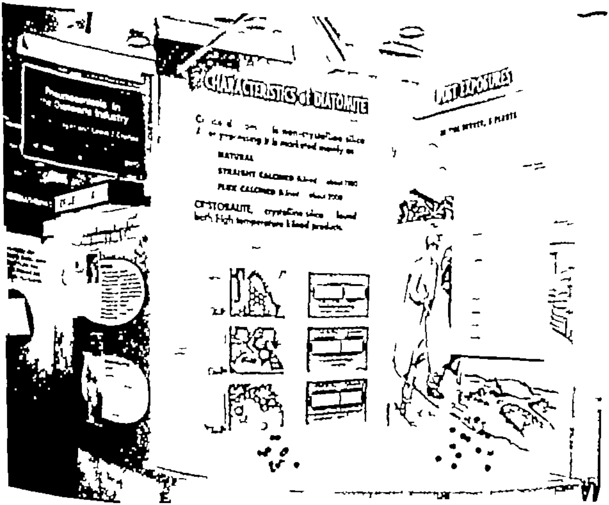
Panels 3 and 4 and 6 and 7 show various radiographic and pathologic findings and conclusions Diagnosis of pneumoconiosis depended largely on radiographic shadows coupled with a work history of dust exposure but those workers given physical examinations also were given

skin tests with tuberculin coccidioidin and histoplasmin routine blood and urine analyses and tests of pulmonary ventilatory function

Panel 8 shows some epidemiologic features of diatomite pneumoconiosis with bar charts to show the relationship between length of employment location of employment in the plant and the prevalence of pneumoconiosis

The last panel outlines the basic methods of eliminating the hazard of diatomite pneumoconiosis Many of the recommendations are based upon time-tested industrial hygiene principles especialyy adapted to the diatomite industry Respirators are used where high intermittent dust concentrations occur

Acknowledgment is made to the management and employees of the plants participating in the study for their cooperation and assistance The special assistance of Dr Armand Brodeur Dr George Jacobson Dr Waldo R Oechsli and Dr Bernard Kordan in interpreting and classifying the roentgenograms is gratefully acknowledged



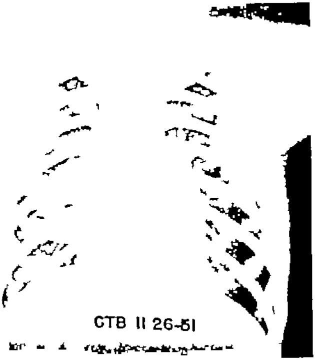
PANELS 1 AND 2

PANEL 3 SIMPLE DIATOMITE PNEUMOCONIOSIS





PROGRESSIVE CHANGES IN AN INDIVIDUAL



Important Characteristics

Pathologic:



Radiographic:

Functional:

Prognostic:

PANEL 4 SIMPLE DIATOMITE PNEUMOCONIOSIS



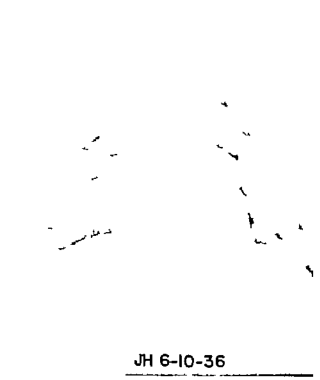


EXAMPLES FOUND IN THE 1953--54 SURVEY





PANEL 6 COALESCENT DIATOMITE PNEUMOCONIOSIS

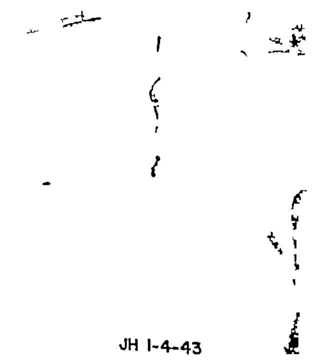


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[illegible]

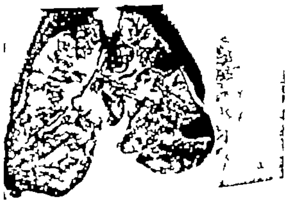
PROGRESSIVE CHANGES IN AN INDIVIDUAL



[illegible]

Important Characteristics

Pathologic: [illegible]



Radiographic: [illegible]

Functional. [illegible]

Prognostic: [illegible]

Etiologic: [illegible]

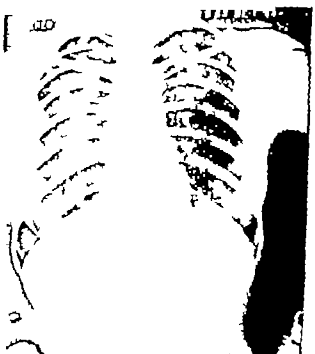
PANEL 7 COALESCENT DIATOMITE PNEUMOCONIOSIS

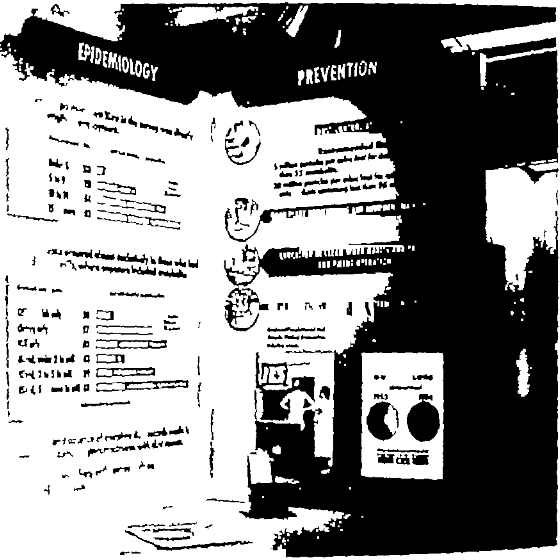




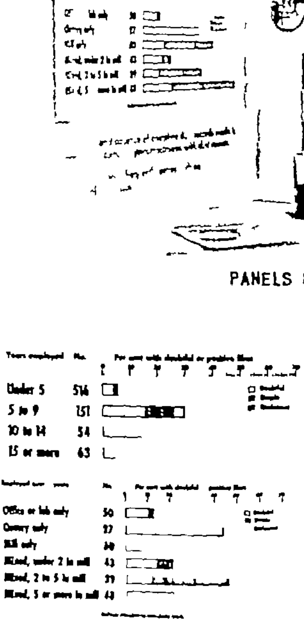
EXAMPLES FOUND IN THE 1953--54 SURVEY

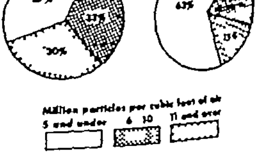






PANELS 8 AND 9



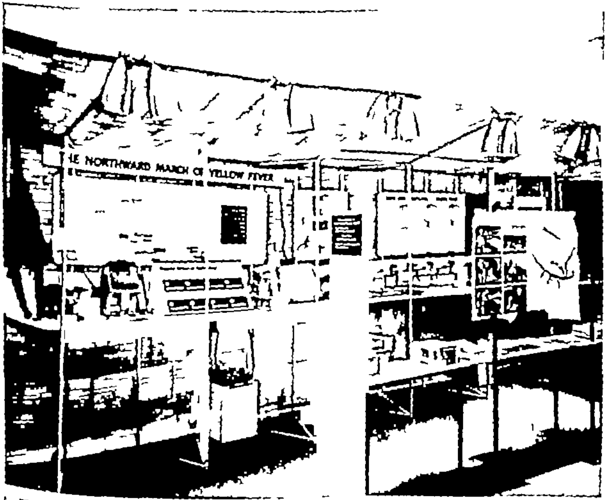


Honorable Mention

PREVENTIVE MEDICINE

Northward March of Yellow Fever H. van Zile Hyde, Public Health Service, Department of Health, Education and Welfare, and International Cooperation Administration, Washington, D. C.

The exhibit alerts the medical profession to the threatened reintroduction of yellow fever into the United States and refreshes their knowledge concerning the diagnosis and treatment of this disease. The exhibit deals with the geographic distribution, epidemiology, clinical and laboratory diagnoses, treatment and prevention of yellow fever.





The last epidemic of yellow fever to occur in the United States was in 1905 when there were 8,399 cases with 908 deaths in the South. Recent outbreaks in other countries have brought yellow fever close to our borders.



DIFFERENTIAL DIAGNOSIS

Mild yellow fever is extremely difficult to diagnose clinically in the absence of a full epidemic. It is readily confused with many febrile illnesses. Moderate to severe yellow fever must be differentiated principally from malaria, Weil's disease, infectious hepatitis, and black water fever. All suspected cases must be confirmed by laboratory diagnosis.

SIGNS AND SYMPTOMS OF YELLOW FEVER

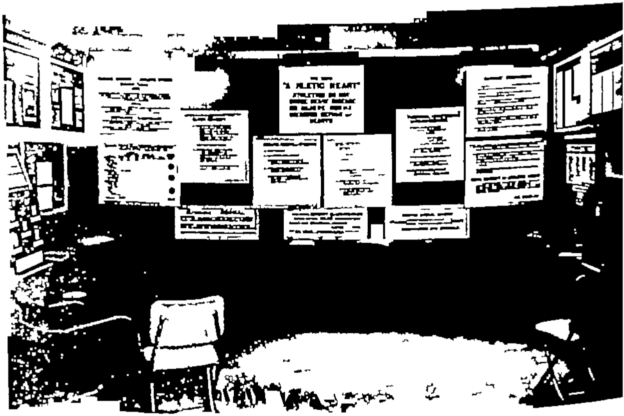






Cardiac Effects of Athletic Work Stress. *J W Wilce Ohio State University Columbus Ohio*

The cardiac effects of athletic stress have long been matter of medical and public interest. The author studied the field of immediate intermediate, and eventual cardiac results of athletic stress in twenty-seven year approach to 237 American athletes with many others in process. Review reanalysis, and modernization of previously published group findings is advanced. Special current athletic cardiac illustrations of the pathology of coronary heart disease with obstruction and myocardial infarction (with evidence of kick off precipitation) in case of pro football player are shown. A constructive, positive reinterpretation rationalization, and premised clarification of the term—Athletic Heart on the basis of clinical evidence, is presented and supported. A cla sification of the hearts of athletes and documentation of certain levels of thinking on the relative cardiac stress of varying types of physical activity is included as suggestiv basis for improved practical clinical physician-patient guidance for athletic and work stress.



THE TERM

"ATHLETIC HEART"

ATHLETICS DO NOT CAUSE HEART DISEASE OR INJURE NORMAL (WEBSTER DEFINITION) HEARTS

DEFINITIONS OF NORMAL

WEBSTER [illegible]

OXFORD CON[illegible] CONFORMING TO [illegible]

GERMAN & FRENCH [illegible] OXFORD

THE POSITIVE LITERAL CONCEPT OF ATHLETIC ([illegible]) HEART IS CONSTRUCTIVE AND DESIRABLE

CLINICAL FACTS FROM A CONTINUATION STUDY OF THE HEARTS OF 237 U.S. ATHLETES

CARDIAC CLASSIFICATION	NO. OF CASES	CARDIAC MEASUREMENTS (ABNORMAL MEAN) NORMAL 0 TO 10+ AREA	DIAM.	NUMBER OF ENLARGEMENTS IN GROUPS AREA	DIAM.	BOTH	TOTAL ENLARGED	PERCENT ENLARGED OF EACH GROUP
I. NORMAL WEBSTER DEFINITION NO DISEASE, STRICTLY NORMAL HEARTS.	[illegible]	[illegible]	[illegible]	0	0	0	0	0
II. ORGANIC POSTULATE CONDITION NOT CAUSED BY BUT EXAGGERATED BY STRESS.	31	[illegible]	13.45	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
III. NO DISEASE PREDISPOSING ETIOLOGICAL FACTORS POSTULATED NORMAL BY OXFORD, GERMAN AND FRENCH DEFINITIONS.	[illegible]	3.49	4.11	[illegible]	[illegible]	34	[illegible]	[illegible]
TOTALS	237						118	50 2

CARDIAC EFFECTS OF ATHLETIC STRESS

CURRENT THESIS

1958

NO HEART DISEASE PREDISPOSING ETIOLOGICAL FACTORS (18+ KNOWN IN 1941 50+ KNOWN IN 1958) – PLUS – ATHLETIC STRESS OF VARYING NATURE, DEGREE, AND LENGTH – MINUS – INHERENT HEART STRENGTH FACTORS

EQUALS

PRESENCE OR ABSENCE OF A CARDIAC ADAPTATION SYNDROME OR SUB ORGANIC ATHLETIC WORK HEART (MAY ALSO EXIST AS RESULT OF WORK OR DAILY STRESS)

POSTULATED SIGNIFICANCE

CARDIAC ENLARGEMENT DEMONSTRATED TO EXIST IN MANY ATHLETES WITHOUT OTHER SUPPORTED EVIDENCE OF DEFINITE ORGANIC STATE

IS RELATIVELY BENIGN

AS COMPARED TO TRUE ORGANIC ENLARGEMENTS OCCASIONALLY FOUND IN ATHLETES AS WELL AS THE USUAL CLINICAL GROUP

I OLDER CONCEPT

EVEN NORMAL HEARTS MAY BE ENLARGED OR STRAINED BY ATHLETICS AND DEVELOP UNDESIRABLE CHARACTERISTICS EARLIER THAN COMPARATIVE HEARTS OF NON ATHLETES

UNPROVEN IN THE HUMAN

a. CORRELATIVE NEED FOR LONG TIME TAPERING OFF IN EXERCISE STRESS IS OBVIOUSLY DESIRABLE FOR THIS AND ANY CONCEPT

— "MOST OF THEM (ATHLETES) DIE BEFORE THEY ARE 50" — FLINT, LANCET, [illegible]

II ORGANIC HEARTS of ATHLETES

MANY COMPETE

CAN ENDURE GREAT STRESS

ATHLETIC STRESS MAY MAKE THE ORIGINAL HEART CONDITION WORSE

STRESS OF ORGANIC HEARTS MAY REDUCE LIFE EXPECTANCY

PROPER LEVEL INDIVIDUALIZED EXERCISE IS CONSTRUCTIVE FOR MOST HEARTS

III SUB-ORGANIC ATHLETIC WORK HEARTS

A. MOST COMMON

B. ADAPTATION ENLARGEMENT FOLLOWING PREDISPOSING FACTORS PLUS STRESS

C. NON ATHLETIC ENLARGEMENT ALSO PROVEN (BOLT-BELL) SAME SYNDROME — SMALLER DEGREE?

D FUNCTION EXCELLENT RESERVE FACTORS UNKNOWN

E EXTREME STRESS POSSIBLE MODERATE ACTIVITY MOST CONSTRUCTIVE

V FUNCTIONAL HEART DISEASE (VARYING DEGREES)

COMMON IN IMMATURE AND NERVOUSLY OR EMOTIONALLY UNSTABLE GROUPS

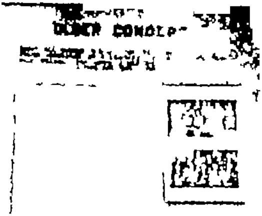
ENLARGEMENT NOT COMMON VARIABLES IN RATE RHYTHM, AND EXERCISE TOLERANCE

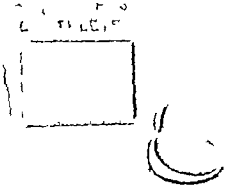
NOT CAUSED (?) BUT EXAGGERATED BY ATHLETIC TENSIONS

AVOID OR MODIFY HIGHER TENSIONS

SLIGHT TO MODERATE ACTIVITY CONSTRUCTIVE AND INDICATED

D NEURO CIRCULATORY ASTHENIA INCLUDED





Evidence against older concept

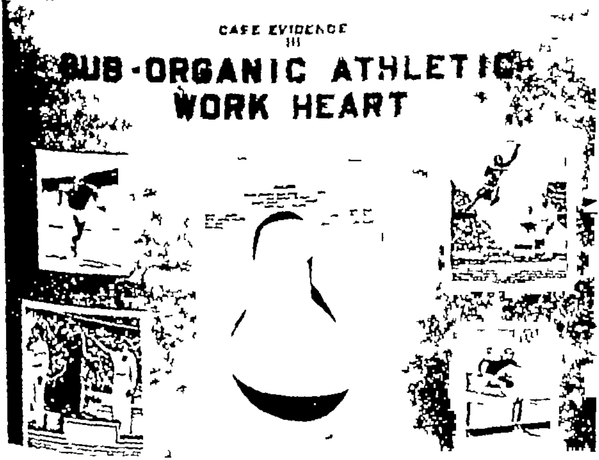
Above - left
A 27 8%— in 55 yr athlete denied insurance by nationally prominent M.D - about 30 Reason, "too much athletics" L. & W at 82 Area 0%

Above - right
Athletes longevity Top - Ohio State Basketball Squad 1897-98 Below - Same at 50 yr reunion Av age 70 93% survival Only death age 69

Organic Hearts of Athletes

Left above - Pro baseballer with R H D after 17 yrs of play- increasing limitation Deceased age 51 "Cor Bovis

Right - below - Played 1 H basketball against doctor s orders (2 leagues) 1930 - area 30%. 1932 area 41 1% 1955 - "Cor Bovis" Deceased age 47



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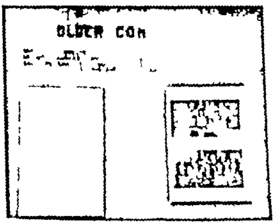
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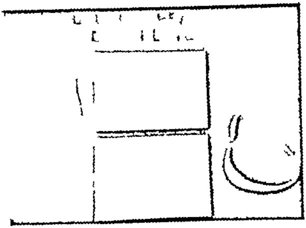
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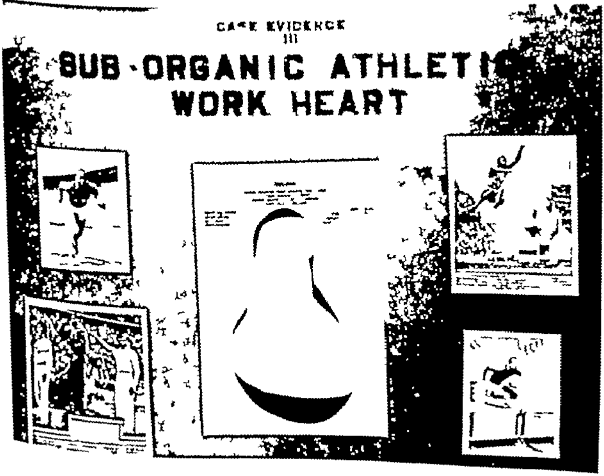
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PATHOLOGICALLY SUPPORTED

POSTULATE

PRO FOOTBALLER PLAYED FULL GAME

WITH KICKOFF PRECIPITATED ANTERIOR

CO ONA Y OCCLUSION

DECEA ED SEVERAL HRS AFTER GAME

COURTESY—

WH ENOS MD

VE MARTENS CAPT

MC USN

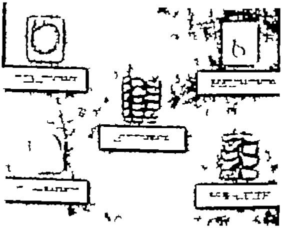
GROSS CROSS SECTION OF ANTERIOR DESCENDING ARTERY IN CASE OF [illegible] [illegible] FOOTBALL PLAYER WHO DIED [illegible] HOURS AFTER PLAYING [illegible] FOOTBALL WITH LARGE MYOCARDIAL INFARCTION.



"CORONARY ARTERIES OF 300 SOLDIERS, AVERAGE AGE 22 1 YEARS, KILLED IN ACTION (KOREAN), WERE DISSECTED "

" IN 77 3% OF THE CASES SOME GROSS EVIDENCE OF CORONARY DISEASE WAS DEMONSTRATED THAT VARIED FROM "FIBROUS" THICKENING TO COMPLETE OCCLUSION OF ONE OR MORE OF THE MAIN BRANCHES

Ref : J A M A , July 18, 1953, Vol 152, Reprint pp 9-10, Major W F Enos, Lt Col R H Holmes, and Capt L. Beyer, U S Army Medical Corps



CORONARY HEART DISEASE

COURTESY

WH ENOS MD

VE MARTENS

CO O

IDA CE

C EASI

GENERALIZED SUMMARY

I ATHLETICS ARE OBVIOUSLY A TREMENDOUS FORCE IN THE INDIVIDUAL, LOCAL, NATIONAL, AND INTERNATIONAL PICTURE

II ATHLETES IN GENERAL, LIVE A NORMAL LIFE SPAN AND MOST OF THEM DO NOT "DIE BEFORE 50", AS HAS BEEN ALLEGED

III THIS STUDY LENDS EVIDENCE THAT INDIVIDUALS WHO COMPETE TOO INTENSIVELY WITH DAMAGED HEARTS; COMPETE TOO STRENUOUSLY TOO SOON AFTER ILLNESS; COMPETE OR RECREATE TOO INTENSIVELY FOR AGE AND CONDITION; VIOLATE, TOO EXTREMELY, THE RULES OF SIMPLE HYGIENE; EXPERIENCE SERIOUS DISEASE, WHICH MAY AFFECT ANYONE; MAY DIE BEFORE THEIR TIME

IV WHILE MANY ATHLETES EXPERIENCE "STRESS ADAPTATION ENLARGEMENT" (WHERE PRE STRESS "PREDISPOSING FACTORS" WERE PRESENT) THESE "SUBORGANIC ENLARGEMENTS" APPEAR RELATIVELY BENIGN AND IN SOME INSTANCES PRACTICALLY DISAPPEAR AFTER VARIABLE PERIODS OF REDUCTION OF STRESS

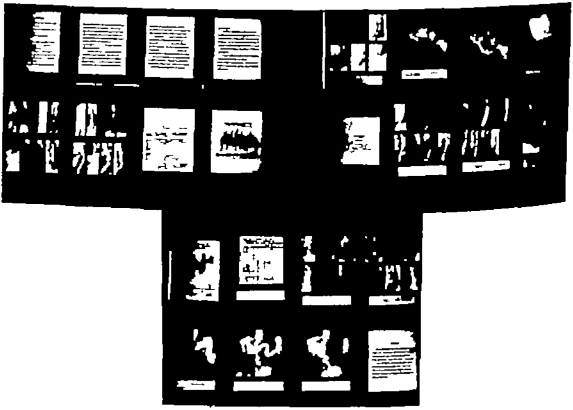
V THE MUCH ABUSED AND EMBATTLED TERM, "ATHLETIC HEART", SHOULD BE POSITIVELY INTERPRETED AS MEANING THE SUPERIORLY STRONG, VIGOROUS, VIRILE, ENDURING HEART

VI THE SLOW PULSE OF SOME ATHLETES APPEARS TO BE INCREASINGLY ACCEPTED AS EVIDENCE OF STRENGTH OR IMPROVED CONDITION RATHER THAN OF ABNORMALITY

VII EVERY EFFORT SHOULD BE MADE TO PROMOTE PROPERLY INDIVIDUALIZED PHYSICAL ACTIVITY FOR "ALL", BUT WITH COMMON SENSE AND COURAGEOUS MEDICAL GUIDANCE

Studies of Esophageal Varices Before and After Portocaval Shunts. John A. Evans and Mary Ann Payne the New York Hospital—Cornell Medical Center New York.

For the past five years continuing study of group of cirrhotic and noncirrhotic patients has been I progress. That part of the study which I pertinent to this presentation concerns group of 68 patients who had roentgenologic *examination for esophageal varices. Fifty-seven patients had* portal caval shunt and of these, 45 had complete radiologic studies of the esophagus pre and postoperatively Nine patients had splenorenal shunt and 2 makeshift type of shunt Of these 11 patients, 7 had complete esophageal studies. *The esophageal finding* in the entire group were correlated with portal pressure changes and postoperative course. All patients on whom shunt was performed had roentgenologic evidence of esophageal varices and had at least 1 episode of bleeding prior to surgery In those patients who had successful shunt esophagrams have shown disappearance of the varices withi the first postoperative year Subsequent follow-up studies in this group have shown no recurrence of varices or postoperative bleeding. Those patients who had an unsuccessful shunt have hewn persistence or recurrence of varices in the postoperative follow-up. This study has demonstrated the accuracy of roentgenologic examination in the diagnosis of esophageal varices and has shown it to be reliable index of the adequacy of venous shunts in bleeding esophageal varices.



INTRODUCTION

This exhibit concerns a group of [illegible] patients who had roentgenologic examination for esophageal varices before and after [illegible] shunt for portal hypertension. [illegible] patients had [illegible] portacaval shunt, [illegible] patients splenorenal and 2 patients [illegible] shunt utilizing smaller mesenteric veins.

The ability to obtain a good mucosal relief pattern of the distal esophagus is the indispensable condition for a satisfactory examination. To accomplish this fluoroscopy, spot filming and a liberal quantity of barium is necessary. A standardized approach to all cases will produce mediocre results. Each case must be individualized to obtain the best results as the degree of esophageal motility and emptying cannot be predicted.

We should like to stress the importance of fluoroscopy and multiple spot film examination. Fluoroscopy will place the esophagus in optimum position for the visual section and avoid the film examination being done before the barium bolus clears the distal esophageal segment. Multiple spot films will help eliminate errors of interpretation due to air bubbles, peristaltic contraction and inadequate coating of the mucosa.

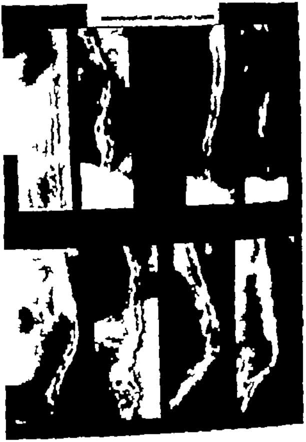
The early diagnosis of esophageal varices requires the recognition of minor alterations in the contours and mucosal pattern of the lower esophageal segment. Varices may produce marginal scalloping similar to that seen in tertiary contractions and may

in addition provide some diagnostic difficulty. [illegible] varices almost always occur in patients in the older age group, produce sharper marginal indentations, involve most of the thoracic esophagus and are usually easily recognized during fluoroscopy. Small varices may at first produce only subtle changes in the mucosal pattern. The sharp linear arrangement of the mucosal folds is replaced by shallow undulations and the spaces between the folds become widened. There may be loss of mucosal definition resulting in a mottled appearance. The latter is of particular significance in young patients. As the varices enlarge the typical bizarre, polypoid lucent defects in the mucosa appear.

In certain cases gastric varices may be the dominant component of gastro-esophageal varices and without examination of the stomach the diagnosis may be missed. Varices may produce contour changes of the gastric cardia and fundus similar to those caused by neoplasms and should be considered in the differential diagnosis.

Factors which may cause difficulty in obtaining a satisfactory examination are old age, a large phrenic ampulla and hiatus hernia. In older persons, atrophy of the mucosa may prevent adequate mucosal relief studies.

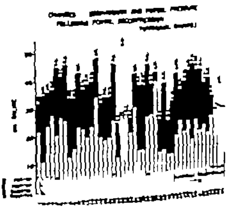


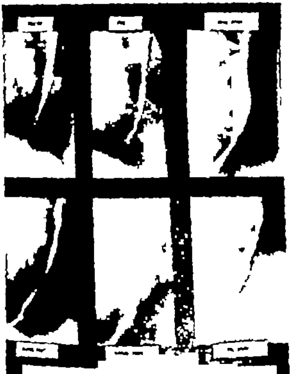


Panel 94 is a summary graph of the patients in our series who had portacaval shunts. Here data is depicted for 43 of the 57 patients who have had end to side portacaval shunts. The 12 patients discarded from this study did not have comparable post operative esophagrams. In this graph the upper border of the black denotes preshunt portal pressure, the lower portion post shunt pressure. It will be noted that most of the initial pressures are well above the borderline level of 30 cm. of saline. All patients had had at least one significant hemorrhage, prior to operation, except #44, a young girl with intractable ascites and esophageal varices.

The portal pressure in most instances was reduced between 15 to 20 cm. by the shunt and the final pressure was from 10 to 20 cm. of saline.

The esophagrams prior to operation with few exceptions showed varices. Examination of the second line (the post operative esophagrams) shows that in 5 patients varices have persisted following operation. Patients #2, and 38 have died post operatively. Patient #2 died of a primary carcinoma of the liver which grew through the diaphragm and obstructed the superior vena cava. Patient #4 also died of carcinoma. Her esophagram had been negative but turned positive prior to death. Patient #38 had thrombosis of the portal vein and had an unsatisfactory shunt and her poor result was not unexpected. Patient #36 has as yet an insufficient post operative follow up. Patient #43 has the only positive post operative esophagram unexplained. His shunt appears technically satisfactory with a good drop in his portal pressure. He seems clinically well. It has been two years since his shunt and he has had 7 esophagrams all showing large varices. This is the only one in the whole series whose esophagram does not correlate with the observed portal pressure changes.

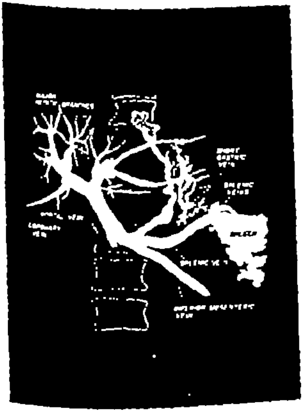




Patient 33 [illegible] portal series. 30 year old male [illegible] with bleeding esophageal varices. [illegible] disappearance of varices and benign post operative [illegible] over 2 year period.

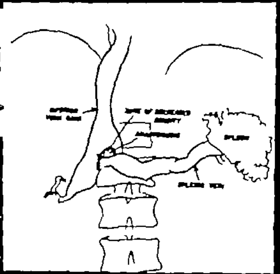


Patient 33 [illegible]





Patient [illegible]





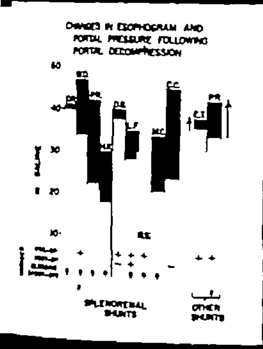
Patient #11 in portacaval series. 40 year old male with cirrhosis - esophageal varices and several hemorrhages. Satisfactory shunt, good drop in pressure, disappearance of varices and clinically well over four year follow up.

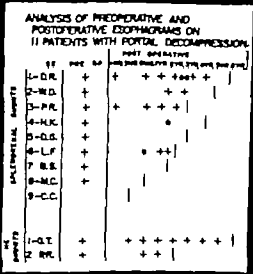


Patient #43 in Portacaval Shunt series showing resolution of varices over 3 year post operative period.



43 year old female with [illegible] cirrhosis. Admitted because of severe hematemesis. Pre-shunt portal pressure 30 cm. H_2O. Post-shunt pressure 14 cm. H_2O. Large pre-operative esophageal varices. 6 weeks post-operative esophagus appears normal.

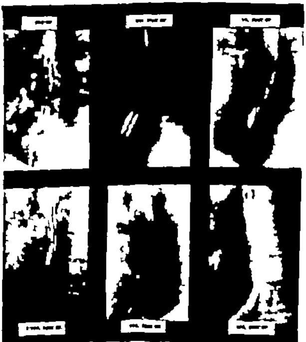




The above graph shows in another form the constancy of the esophagram as [illegible] serial study. This is the same group of cases diagrammed with [illegible] time sequence starting with the pre-operative esophagram and following the course over [illegible] year period.



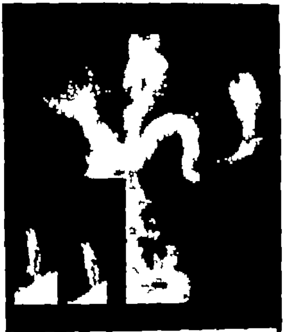
Patient [illegible] in splenorenal series. 13 year old girl with portal hypertension and bleeding varices secondary to extra hepatic obstruction. Unsatisfactory shunt—persistent [illegible] hemorrhage. Esophago-gastrectomy with again recurrence of varices. Six year course.



Patient [illegible] in splenorenal series. 34 year old male cirrhotic with bleeding esophageal varices. Satisfactory shunt, good fall [illegible] pressure, disappearance of varices, clinically well [illegible] year follow up.



Representative films from emergency pre shunt percutaneous splenoportogram



52 year old male with Cruveilhier-Baumgarten Syndrome (patent umbilical vein). Small varices but no bleeding.



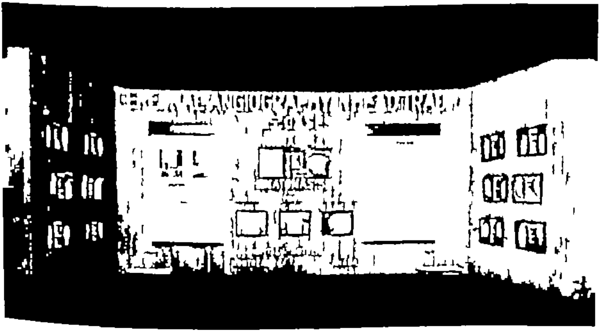
splenic injection demonstrates opacification of large umbilical vein and filling of "Caput Medusae

SUMMARY

Our experience has demonstrated roentgen examination of the esophagus for varices to be an extremely useful diagnostic tool in following the patient with portal hypertension. In the above series it correlates extremely well with the results expected from portal pressure taken in the operating room. It also correlates closely with the observed clinical course of the patient and alerts the clinician to the danger of impending hemorrhage.

Cerebral Angiography in Head Trauma- Report of 215 Cases. J L. Leger C. Bertrand a d M. Dufresne Notre Dame Hospital Montreal Canada

The exhibit presents a description of technic and indications together with an evaluation of results of 215 cases. Typical cases include subdural hematoma epidural hematoma intracerebral hematoma and miscellaneous cases.



All kinds of accidents occur more and more in these years Particularly road accidents are responsible for a greater number of victims suffering from serious brain damage In our hands cerebral angiography has proved to be as safe a procedure as all others in neuro-surgical means of exploration having no deaths in a total of 1370 cerebral angiographies

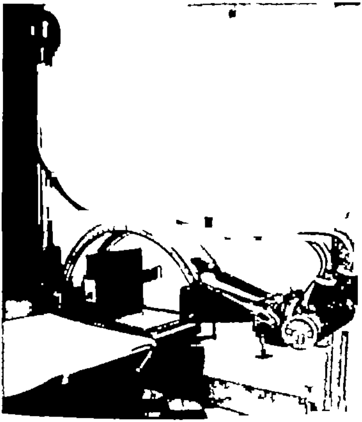
|TECHNIC|

TEAM WORK

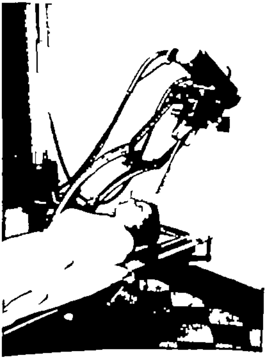
neuro-surgeon | radiologist | anesthetist

- diodrast 35% (percutaneous internal carotid injection)
- large films including neck (10x12)
- 3 films A-P
- 3 films in lateral projection
- pause after injection to see wet films permits restoration of equilibrium of cerebral circulation
- other films decided according to findings on wet films
- timing of exposures according to lesions looked for
- general anesthesia
- average duration of examination 30 minutes

|TECHNIC|



craniograph
with
angio device



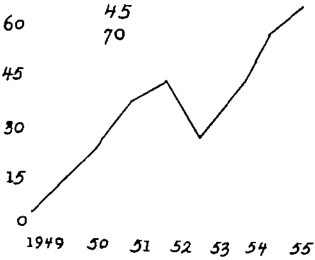
STATISTICS

1949-1956

TOTAL CEREBRAL ANGIOGRAPHIES → 1370

TOTAL CEREBRAL ANGIOGRAPHIES IN CASES OF HEAD TRAUMA → 215

year distribution



age distribution



results

negative examinations	101
positive examinations	108
failures	6
total	215

Positive examinations (108):

- 55 subdural hematomas
- 33 epidural hematomas
- 27 intracerebral hematomas
- 7 subdural hygromas
- 2 arterio venous aneurysms
- 1 arterial carotid thrombosis
- 1 traumatic arterio venous aneurysm
- 1 arterial aneurysm

relation to skull fractures

77 cases with skull fractures
37 skull fractures with negative examination
53 positive examinations without fractures
25 epidural hematomas with fractures
8 epidural hematomas without fractures

hematomas localization %

temporal	50%
parietal	33%
frontal	10%
occipital	7%
bilateral	5%

type of accident

road accidents	62%
fall on head sidewalk stairway etc	21%
shock on head fight sport (hockey baseball)	17%

road accidents (62%):

- car
- motorcycle
- truck
- bus
- tramway
- train

} 1%

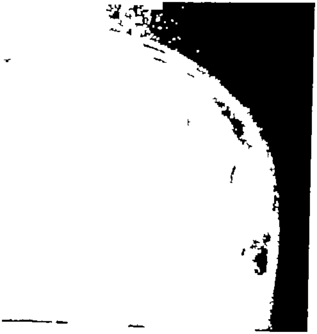
CASE 1

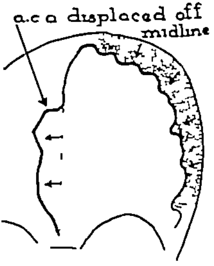
A-P lateral



normal cerebral angiography

CASE 2

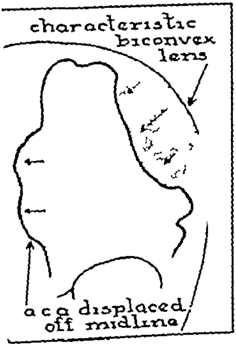




acute subdural hematoma

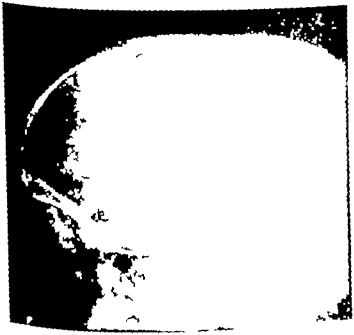
CASE 3





chronic subdural hematoma

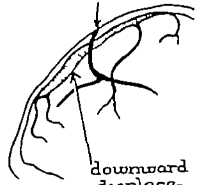
CASE 4





hematoma in the frontal region

CASE 5



epidural hematoma

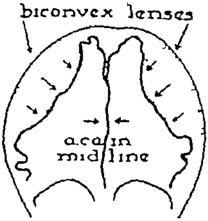
CASE 6



acute bilateral subdural hematoma

CASE 7





chronic
bilateral
subdural
hematoma

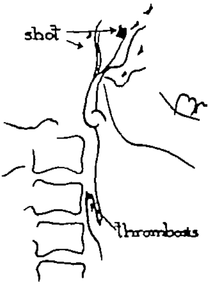
CASE 8



arterio-venous aneurysm-post traumatic intra cerebral hematoma

CASE 9





internal carotid thrombosis by shot-gun

CONCLUSION

215 cases of head trauma were submitted to cerebral angiography since 1948 101 of the patients were not submitted to exploration because of their negative angiograms
An accurate diagnosis of the lesion and its location was possible for 108 cases thus giving the neuro-surgeon the possibility of choosing the right way of approach for these kinds of lesions, and we believe that a better survival percentage can be obtained because of a better diagnosis

Certificate of Merit

How Does Cancer Grow?—Pulmonary Metastases. V P Collins, P Gibbs and I. David Baylor University College of Medicine and Jefferson Davis Hospital Houston Texas

Using serial radiographs which show growth of pulmonary metastases, a method is presented fo measuring and comparing the growth rates of human cancer This reveals certain illusions that commonly influ ence clinical observations. The possible sig ificance of measured g owth rates in cancer investigation and the apy are illustrated



How DOES Cancer Grow?

Purpose Of The Exhibit

Our understanding of cancer upon which depend diagnosis and appropriate treatment is handicapped by certain illusions inherent in the growth process and by a comfortable laxity in clinical comments

The intent of this exhibit is:

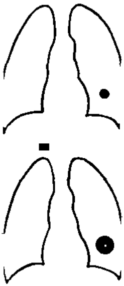
1 To demonstrate three common illusions

2 To propose a more precise description of growth

3 To suggest that although disorderly cellular patterns may be a morphologic characteristic the growth of cancer <u>is</u> orderly permitting both prediction of future behavior and reconstruction of past behavior

8 Illusions

① Twice As Big?



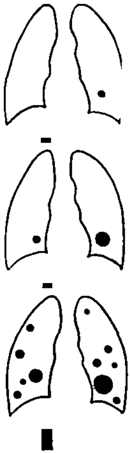
A pulmonary metastasis (or palpable nodule) is apt to be described loosely as having doubled in size But to "double in size" is not specific

To be exact -



If DIAMETER doubles -	1	2
Then VOLUME increase 8 times -	1	8
Not by addition but by DOUBLING	(1-2)(2-4)(4-8) ← 3 →	
If this occurred in a known INTERVAL. e g	← 90 days →	
Rate of growth would be DOUBLING TIME	30 days (90/3)	

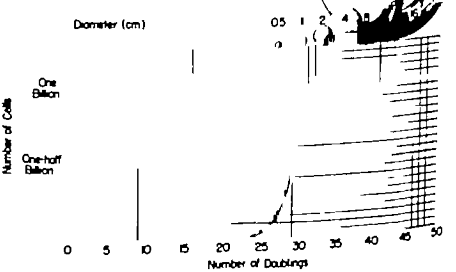
② Growing Faster?



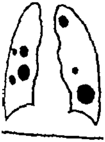
No change in rate of growth'

The curve is produced by a constant rate of doubling

The nodule that appears "suddenly" and grows "rapidly" is produced by a constant rate of growth by doubling



[illegible]



The ones we *see* grow at the same rate

Metastases may appear at different times in different sizes or before the primary is discovered This appears to be due to different rates of growth of different portions of the same tumor in one patient

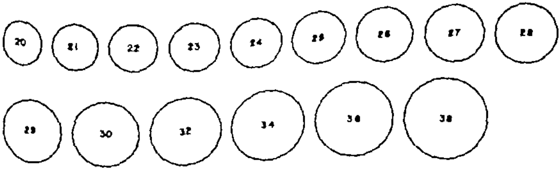
It is possible and likely that of the billions of cells produced in the growth of cancer strains develop which do grow at different rates Slower strains are outdistanced before they can be discovered

By rare chance two nodules growing at different rates might reach the same size at the same time The hare and the tortoise might for an instant in their race be caught neck and neck but not for long The fast outdistance the slow and dominate the finish which is all we see

Measurement

Pulmonary metastases which grow as rounded nodules can be permanently recorded and measured in serial x-ray films

Measurements can be made most accurately by obtaining the best fit using a transparent acetate skiometer with graduated circles

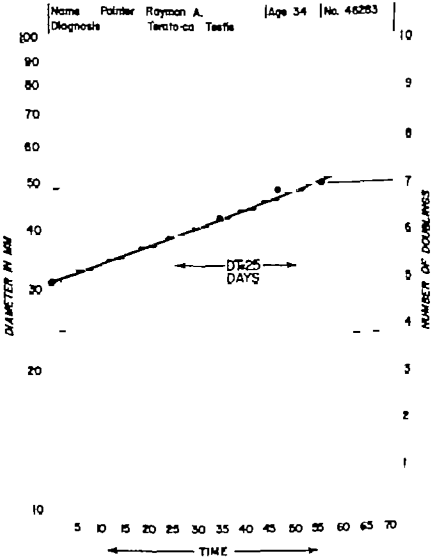


Measurement

The measurements were obtained from serial chest films of a patient with pulmonary metastases from a teratocarcinoma of testis

Date	Interval	Diameter
September 24	Day 0	34 mm
October 28	" 34	44 mm
November 9	" 46	50 mm
November 18	" 55	52 mm

When the diameters are plotted on specially designed graph paper the slope of the line can be read as "Doubling Time" for the particular metastasis in this case 25 days



Conjecture

What is the duration of cancer before diagnosis?

--If the growth rate is the same, then the duration is equal to approximately 30 doublings of 20 days each or about two years

--If the growth rate is slower this duration is even longer

If the growth rate is faster then duration is shorter but we must believe that cancer grows more rapidly at first and then begins to grow slower about the time of diagnosis

Explanation

Why do metastases sometimes appear after a period of years?

It is unnecessary to invoke an explanation of dormant cancer cells suddenly beginning to grow

Doubling times of over a hundred days are common If 30 doublings are required to achieve a nodule 1 cm in diameter a cancer with a doubling time of 120 days would require 10 years of steady silent growth to reach this size

Application

Radiotherapy chemotherapy and hormone therapy may cause certain pulmonary metastases to shrink or disappear If the growth rate of the metastasis before treatment is determined in the manner demonstrated plotting measurements after treatment show rate and degree of regression Often growth will be resumed but the depression of the growth line is a quantitative estimation of the effect of treatment

Correlation

[illegible]	[illegible]
A specific pathologic diagnosis implies a typical and expected behavior for the cancer named	
	Individual cancers have specific growth rates which govern their behavior before and after diagnosis
Cancers are commonly described as rapidly growing and malignant or slowly growing and benign These impressions do not permit precise comparison or measurement	
	Growth rates of individual cancers may be expressed as "doubling time" in days Less than 25 is fast 25 to 75 is common more than 75 is slow
The duration of cancer before diagnosis is not known but the principal cause of failure is that diagnosis and treatment are too late	
	Total duration of cancer is 40 to 45 doublings and of these 20 to 30 occur before the time of diagnosis

Summary

The most important characteristic of cancer is that it grows

The growth of cancer tends to create certain illusions that can be dispelled by thoughtful observations

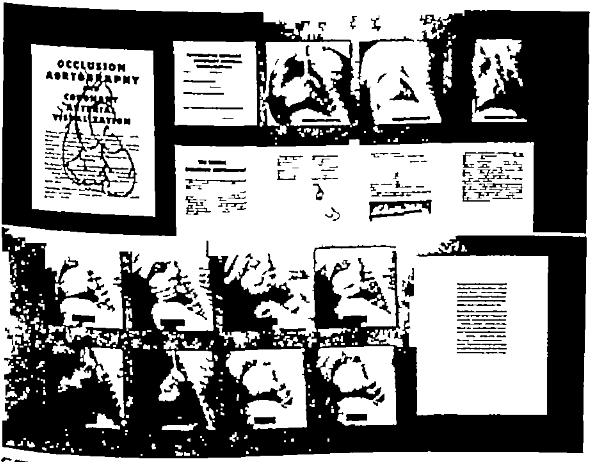
The measurement of growth rate of pulmonary metastases as seen in serial x ray films provides some basis for estimating the duration of cancer

Honorable Mention

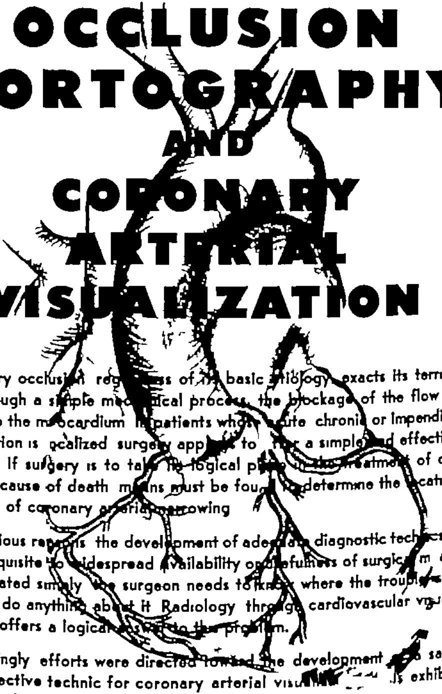
RADIOLOGY

Coronary Arteriography: A New Technique Charles T Dotter and Louis H. Frische University of Oregon Medical School Portland

Films and translights describe and illustrate problems and approaches to the radiographic visualization of the coronary arterial system.



OCCLUSION AORTOGRAPHY AND CORONARY ARTERIAL VISUALIZATION



Coronary occlusion regardless of its basic etiology exacts its terrific toll through a simple mechanical process, the blockage of the flow of blood to the myocardium In patients whose acute chronic or impending obstruction is localized surgery applies to offer a simple and effective remedy If surgery is to take its logical place in the treatment of our leading cause of death means must be found to determine the location and site of coronary arterial narrowing

For obvious reasons the development of adequate diagnostic technics is a prerequisite to widespread availability of usefulness of surgical measures Stated simply the surgeon needs to know where the trouble is if he is to do anything about it Radiology through cardiovascular visualization offers a logical answer to the problem.

Accordingly efforts were directed toward the development of a safe and effective technic for coronary arterial visualization [illegible] exhibit presents the results.

From the Department [illegible] Radiology of the University of Oregon Medical School [illegible]

ALTERNATIVE METHODS OF CORONARY ARTERIAL VISUALIZATION

[illegible]

ANGIOCARDIOGRAPHY

[illegible]

RETROGRADE AORTOGRAPHY

[illegible]

LEFT VENTRICULAR CARDIOANGIOGRAPHY

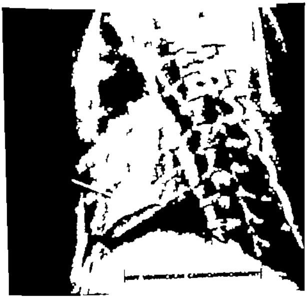
[illegible]



ANGIOCARDIOGRAPHY



RETROGRADE AORTOGRAPHY



LEFT VENTRICULAR CARDIOANGIOGRAPHY

THE TECHNIC OF OCCLUSION AORTOGRAPHY

In essence, this procedure consists of the injection of contrast agent through a catheter into the proximal aorta during brief but complete occlusion of the ascending aorta peripheral to the site of injection. The occlusion is produced by the inflation of balloon on double-lumen catheter the other lumen of which is used for the injection. Injected into the aorta between the site of artificial occlusion and the aortic valves, the entire dose of contrast agent usually enters the coronary arteries, thus eliminating the unpredictable effects of dilution and random distribution.

There results definite reduction in the volume of contrast agent required to produce consistently good results. In addition, the increased efficiency of controlled injections allows the use of contrast agents which, though less radiopaque than conventional media, are much less likely to cause untoward reactions.

Thorotrast is believed to be the contrast agent of choice in this procedure for the following reasons: 1. It produces satisfactory opacification. 2. It is pharmacologically the mildest intravenous contrast agent with which we have experience. 3. The method of injection eliminates the possibility of extravasation of thorotrast and its sequellae. 4. The slight radioactivity exhibited by thorium may be disregarded in view of these advantages, in view of the usual age-range of patients with coronary artery disease, in view of the small doses employed, and—most importantly—in view of the hazard presented to the patient by incompletely diagnosed coronary artery occlusion.

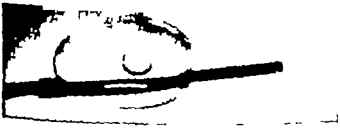


Occlusion aortography is performed as follows:

Through cut-down, the special double-lumen balloon catheter is introduced into the right brachial artery at convenient point above the antecubital fossa. It has been our practice to employ light general anesthesia for the entire study. Heparin is used as in conventional aortic catheterization.

Under fluoroscopic control, the catheter is advanced until its tip lies in the ascending aorta about 2 to 4 cm. above the level of the aortic valves. A fluid or gaseous contrast medium is then used to inflate the balloon located near the end of the catheter. One or two brief trial inflations serve to check the location of the balloon and indicate the inflating volume necessary to produce complete occlusion. This is assumed to be present when the balloon contour becomes identical with that of the aorta in which it lies. Efforts are made to exclude subsequent alteration in the position of the catheter.

The patient is then positioned for rapid serial radiographic studies and a continuous electrocardiographic tracing is begun.



When all is in readiness, the balloon is then inflated as rapidly as possible to the predetermined degree necessary for occlusion. If fluid contrast agent is used for the inflation, this may be expected to take 10 to 20 seconds. The use of appropriate gases (e.g., carbon dioxide or nitrous oxide) greatly speeds up this process and is, therefore, preferred. Simultaneous with the onset of complete inflation, the injection of 10 to 15 cc. of contrast is carried out through the other catheter lumen. This injection is usually completed in 2 to 4 seconds, and balloon deflation is carried out immediately. It has not been our practice to repeat injections more than twice.

The catheter is withdrawn, the artery repaired, and the cut-down incision closed. Anesthesia is terminated.

Precautions to be observed include the avoidance of accidental displacement of the tip of the catheter following its fluoroscopic placement and prior to the injection. Generally, partial or complete inflation of the balloon coupled with withdrawal of the catheter results in sensation of resistance when the balloon impinges upon the orifice of the innominate artery. If the catheter and balloon are of the appropriate dimensions, this position may be assumed to be satisfactory.



Certificate of Merit

DIET

Serum Iron (SI) and Total Iron-Binding Capacity (TIBC) in Liver Disease

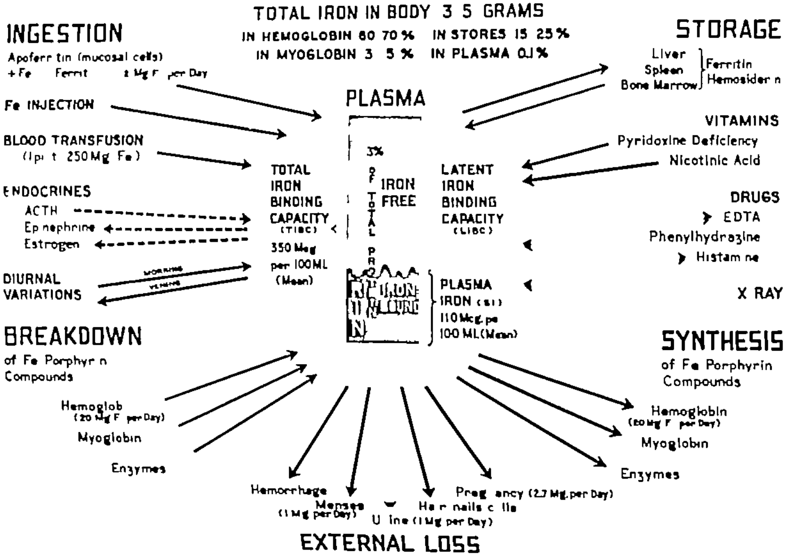
Emanuel E. Mandel Leona M. Niespodziany and Jeanne A. Coope Chicago Medical School Northwestern Medical School and Vete ans Administration Research Hospital Chicago

A practical method for the measurement of serum iron in 1 ml of serum has been developed, utilizing single stable reagent. TIBC is determined by applying the method of another ml. of serum, previously supersaturated with ferric compound and treated with resin IRA 410. Both methods lend themselves for routine laboratory use. Low SI is frequently found in cirrhosis and in neoplastic disease hyperferremia in hemolytic anemia, viral hepatitis and hemochromatosis. Decreased TIBC occurs chiefly in cirrhosis including hemochromatosis, while an increase is often encountered in hepatitis. Combination of both determinations is useful in diagnosis.

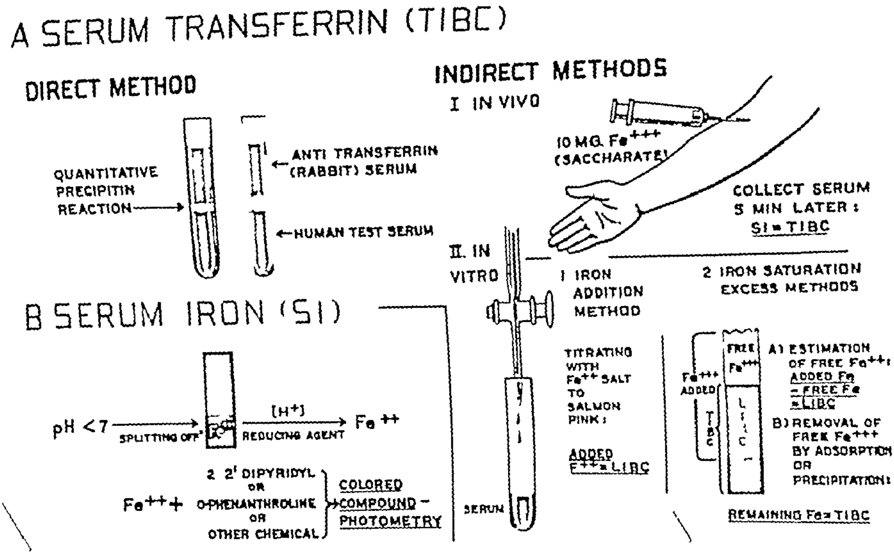


From the
Medical Illustration Service
of the
Veterans Administration Research Hospital
Chicago

FACTORS INFLUENCING PLASMA IRON TRANSPORT IN THE ADULT

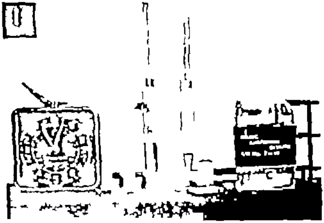


ANALYTICAL PRINCIPLES

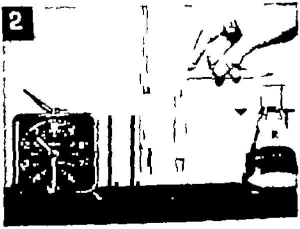


AUTHORS' METHODS

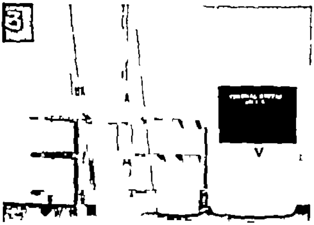
A SERUM TRANSFERRIN (TIBC)



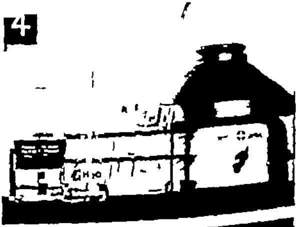
[illegible] tube U1) and 0.1 ml. of reagent C are [illegible]



[illegible]



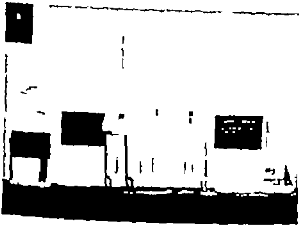
Two ml. of buffer V are added, and the contents are stirred well.

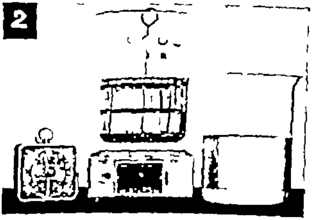


[illegible] TIBC ([illegible] per 100 ml.) = [illegible]

AUTHORS' METHODS

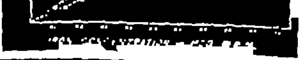
B.SERUM IRON (SI)



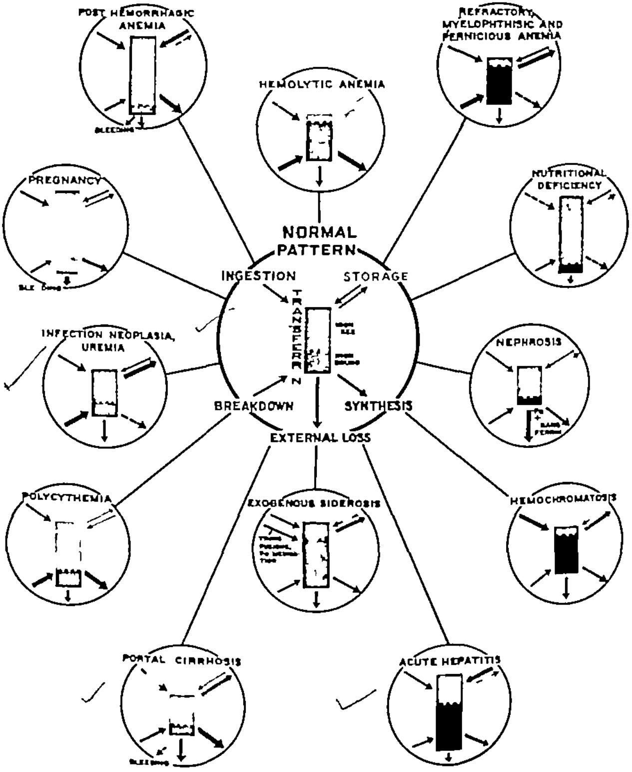


All tubes are heated in boiling water, then cooled.

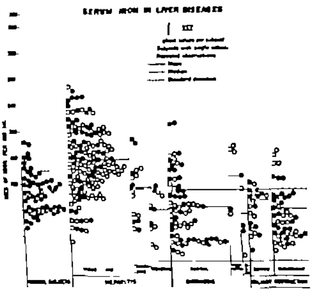


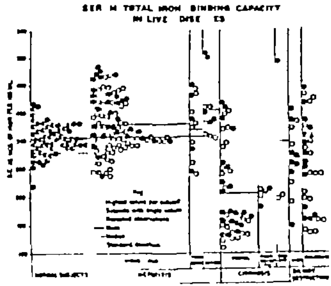


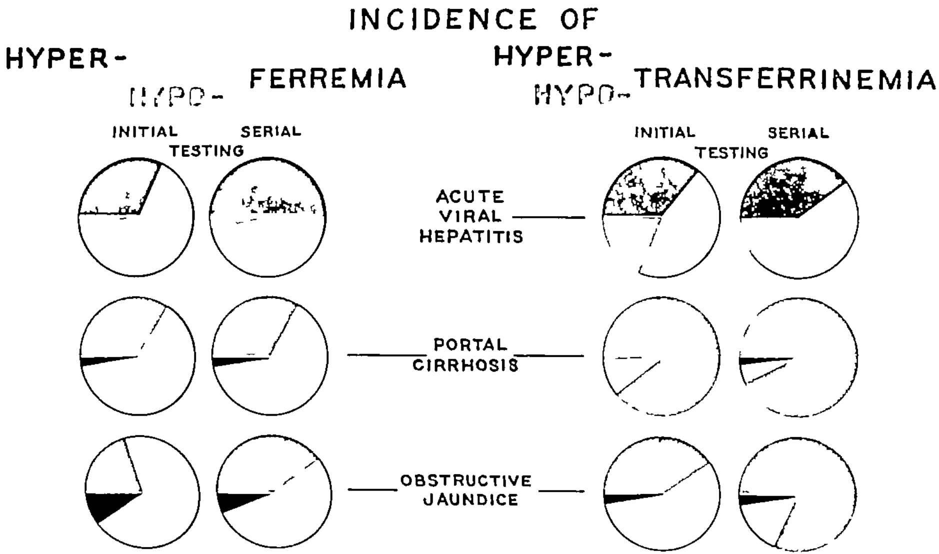
CLINICAL VARIATIONS



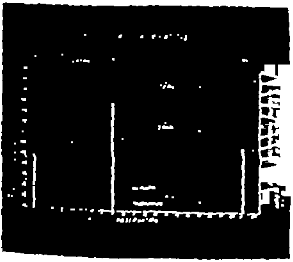
VARIATIONS IN LIVER DISEASE

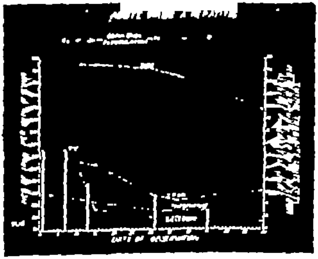


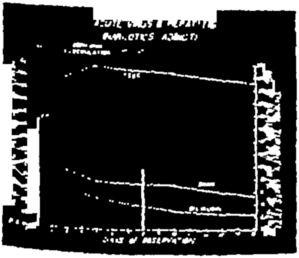


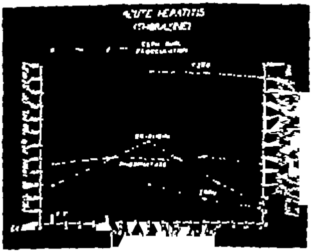

INCIDENCE OF
HYPER-
HYPO-
FERREMIA
HYPER-
HYPO-
TRANSFERRINEMIA
INITIAL
SERIAL
TESTING
INITIAL
SERIAL
TESTING
ACUTE
VIRAL
HEPATITIS
PORTAL
CIRRHOSIS
OBSTRUCTIVE
JAUNDICE

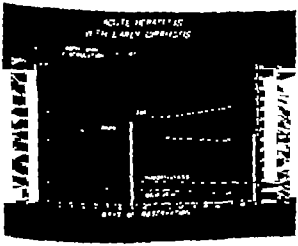
TYPICAL CASES

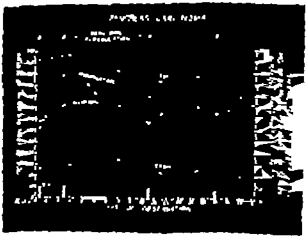












CONCLUSIONS

1 The wide normal range of both **SI** and **TIBC** limits their diagnostic utility

2 The numerous possible (physio-, pharmaco-, pathological) influences must be kept in mind

3 **SI** and **TIBC** may, especially when applied serially, significantly contribute to-

↓

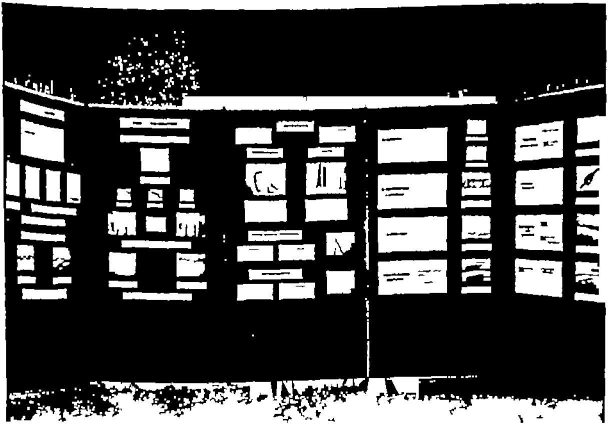
THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE AND/OR HEPATOMEGALY

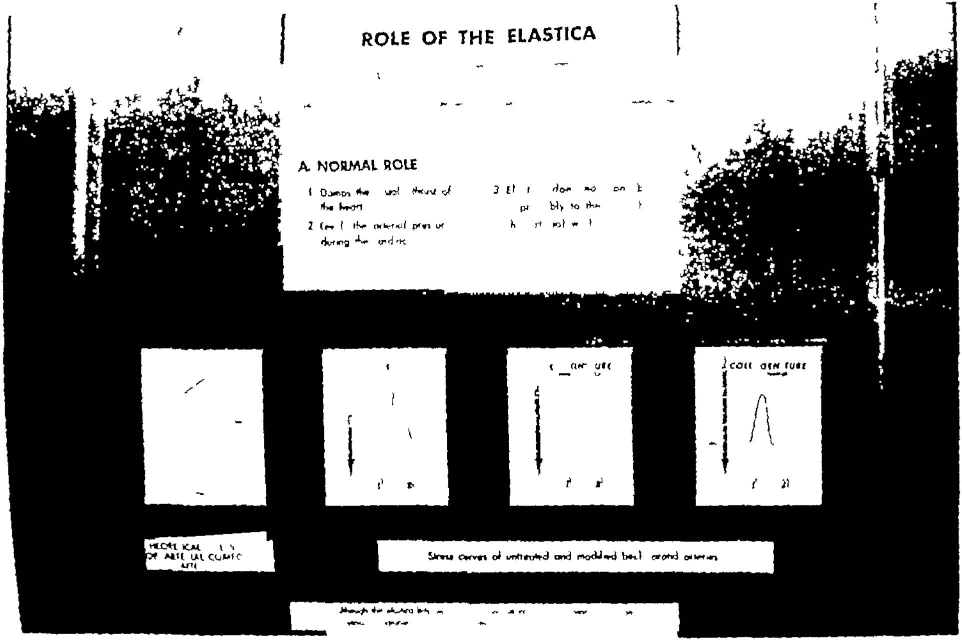
Test	Acute Hepatitis Viral	Acute Hepatitis Toxic	Cirrhosis	Hemolytic Jaundice	Hemochromatosis	Biliary Obstruction Benign	Biliary Obstruction Malignant
SI	↑	↑ / —	— / ↓	↑	↑	—	— / ↓
TIBC	↑	↑	↓	— / ↓	↓	— / ↓	— / ↓

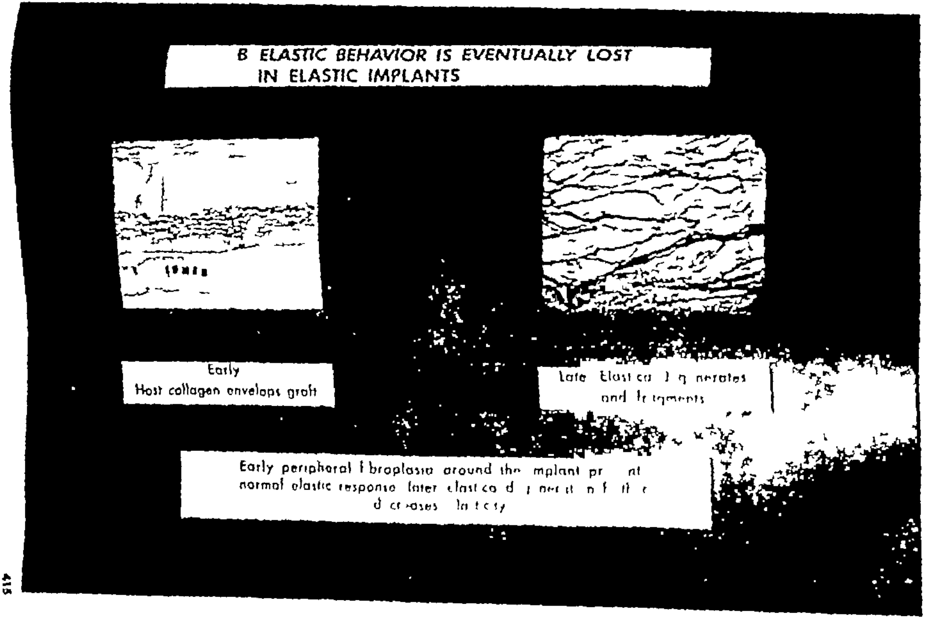
Honorable Mention

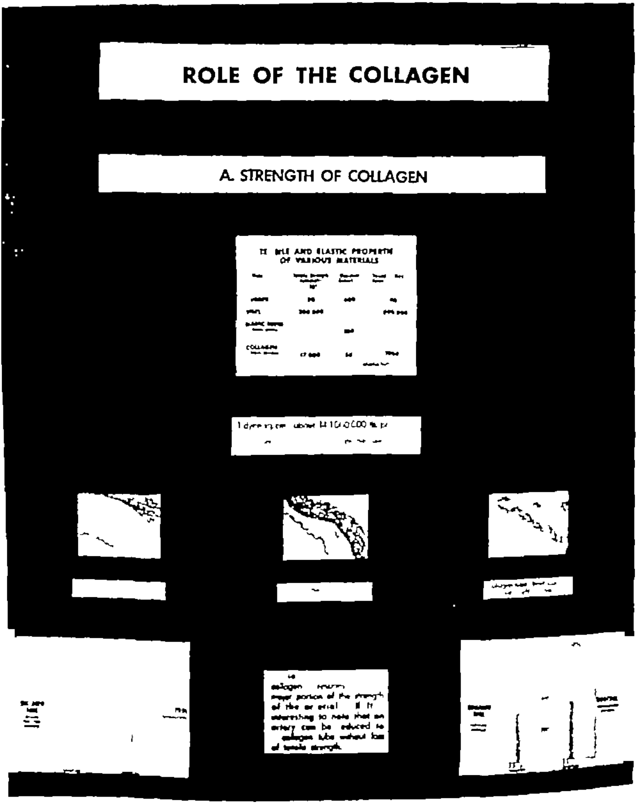
Arterial Grafts: Factors Involved in Success or Failure Norman Rosenberg John Henderson E. R. L. Gaughran, Geoffrey H. Lord and Jocelyn Fielding Douglas Middlesex General Hospital, St Peter's General Hospital and Johnson & Johnson Research Foundation New Brunswick N J

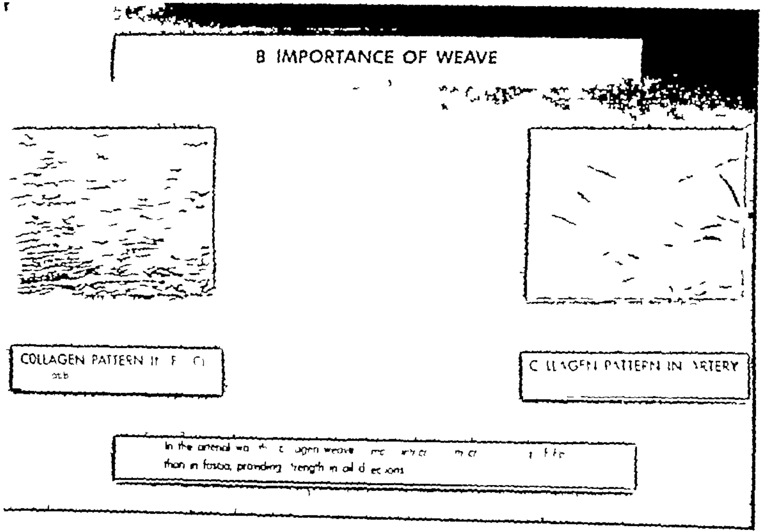
This exhibit analyzes the factors leading to success or failure of arterial grafts and prostheses. Information is presented on the physical properties of the elastica and collagen components of the vessel wall these tissue elements being isolated by a process of enzymatic dissection. Both acceptable and experimental arterial substitutes are demonstrated Causes for graft failure and degenerative changes leading to poor results are illustrated in some detail.




ROLE OF THE ELASTICA
A. NORMAL ROLE


B ELASTIC BEHAVIOR IS EVENTUALLY LOST
IN ELASTIC IMPLANTS
Early
Host collagen envelops graft


ROLE OF THE COLLAGEN
A. STRENGTH OF COLLAGEN

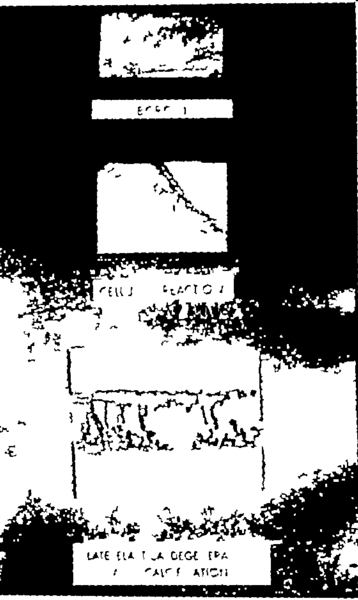

B IMPORTANCE OF WEAVE
COLLAGEN PATTERN
PATTERN IN
than in fascia, providing

A. NECROSIS

1. Leads to increased c... [illegible] reaction
2. Delays fibroblastic [illegible] capillary [illegible]

B. CALCIFICATION

1. HOMOGRAFT



2. HETEROGRAFT

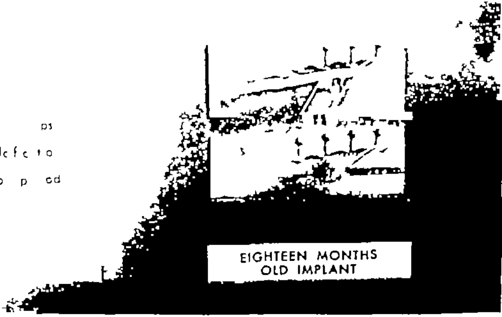
The react on here s milar to that seen w th homografts but w th g ea er se er ty and possibly g eater f equency



METAPLASTIC CHONDRIFICATION IN HETEPOGRAFT

3 ENZYME DISSECTED HETEROGRAFT

[illegible]



C THROMBOSIS

–ETIOLOGIC FACTORS

1 Nature of Implant

H te og afts show a oate inc dence of thrombos s than homografts

2 Length of implant and diameter

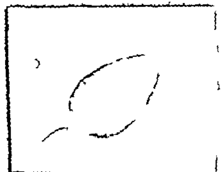
Thrombos s is mo l kely n long g afts of small r bore



3 Hemodynamic Factors and Fit

a) Const ict on at suture line leads to turbulence and eddy currents favoring th ombosis

b) Fall in blood p essu e a d blood flow may predispose to th ombos s



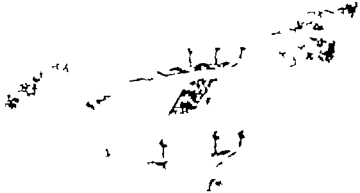
POOR FIT → EDDY CURRENTS → THRO ?OSIS

2. HETEROGRAFT

Th   act on here s s m la to that seen with homog afts but w th g catr so ar ty and poss bly greater frequency



M TAPLA TIC CHONDRIFICATION IN HETEROGRAFT



Hektoen Gold Medal

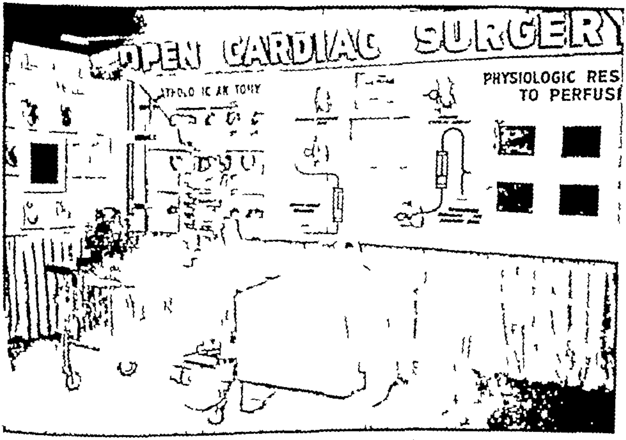
SURGERY, GENERAL AND ABDOMINAL

The Direct (Open) Surgical Repair of Congenital and Acquired Intracardiac Malformations.

C. W Lillehei H E. Warden R A. DeWall, V L. Gott R. D Sellers, M. Cohen, R C. Read R. L Va co and O H Wangensteen, University of Minnesota Medical School Minneapolis.

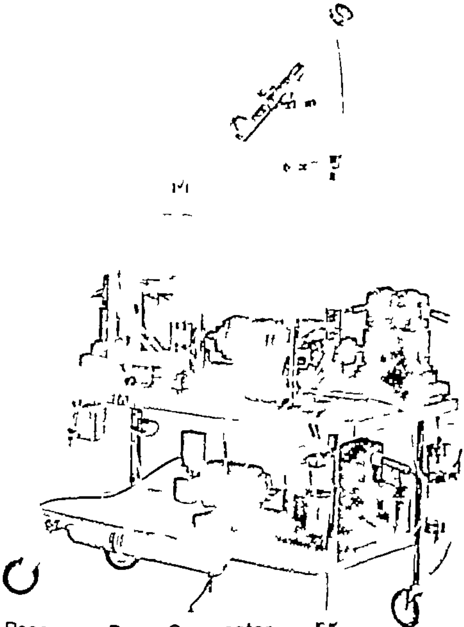
This exhibit presents composite of open cardiac surgery made possible by total cardiac by pass and the use of extracorporeal oxygenation at normal body temperature A model of the bubble oxygenator and perfusion apparatus currently used in this clinic are demonstrated The evolutionary steps in the development of the system and pertinent physiologic data as well as many of the common pitfalls to the successful experimental or clinical application of these methods are presented. The surgical pathologic features of many of the congenital and acquired intra and juxtacardiac maladies that are amenable to correction under direct vision are shown In addition the surgical techniques that have evolved for the repair of these defects are also presented

Figure The Efficient Perfusion Apparatus Utilized for These Open Cardiac Procedures is Shown in the Foreground of this Overall View



This exhibit portrays th accomplishments made possible by intracardiac reparative procedures carried out utilizing total cardiopulmonary bypass at normal body temperatures The methods develop d and techniques recommended are based upon an analysis of the experience with 350 patients who have undergone cardiopulmonary bypass in this clinic since 1954 The physiologic responses to perfusion the pathologic physiology and anatomy of many of the congenital and acquired intra and juxtacardiac lesions an enable to correction under direct vision are shown

The pump consists of a single explosion proof electric motor which activates two pumping heads (arterial venous) each equipped with an individual speed changer all mounted on a single base The artificial (large bubble) oxygenator has no moving parts is sterilized by autoclaving and is constructed entirely of polyvinyl plastic tubing which is discarded after each perfusion From right to left may be noted the vertical mix ing tube the inclined transverse debubbling chamber and the helix reser voir immersed in a constant temperature waterbath The venous blood is drained from the patient's caval cannulas by gravity into a plastic reser voir (seen attached to the leg of the pump table farthest to the right) From this chamber the blood is circulated by the venous pump to the mix ing tube From the lower end of the helix the oxygenated blood is re turned through disposable filters to the patient's arterial system via a cannula in the patient's subclavian or femoral artery The oxygen gas enters the venous blood directly through a nylon plastic diffusion plate at the base of the mixing tube The venous blood carbon dioxide escapes with the excess oxygen during oxygena tion



oronary sinus turn pump and plastic reservoir (attached to table leg in lower fore ground) for return ing to the oxygen ator blood aspir ated from the open heart is seen on the lower level of the pump table

Figure 2 Helix Reservoir Pump Oxygenator Utilized for Direct Vision Intracardiac Surgery

REPRESENTATIVE PATHOLOGIC PHYSIOLOGY

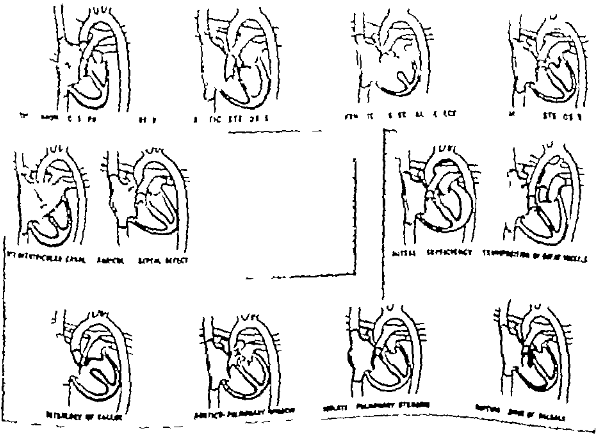


Figure 3 The abnormal physiology of many of the congenital and acquired cardiac malformations that are now amenable to correction by means of open surgical techniques are schematically represented The slide projector in the center of this panel presents the diagnostic features of these malformations

PATHOLOGIC ANATOMY

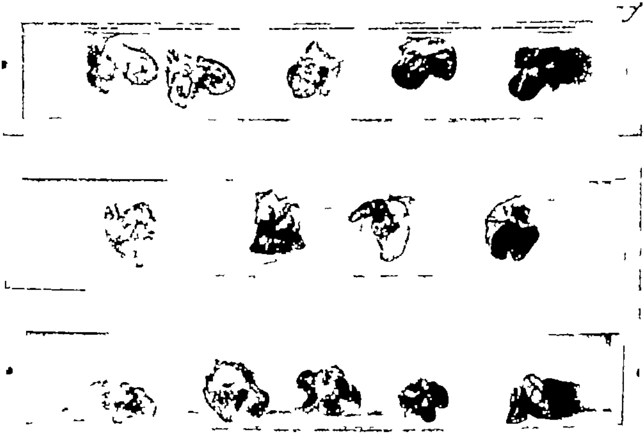


Figure 4 The pathologic anatomy of many of these commonly occurring congenital intracardiac anomalies as well as the techniques of surgical correction are presented by the wax models (cast from actual specimens) The pertinent technical recommendations emphasized are as follows Most atrial septal defects of the secundum type are closed very satisfactorily by interrupted mattress stitches of silk Some of the smaller ventricular defects with fibrous margins are amenable also to this simple type of closure Most ostium primum lesions and larger ventricular septal defects (whether occurring as isolated lesions or in Fallot's tetralogy) are best closed without tension by the precise place ment of multiple interrupted mattress stitches circumferentially about the margins of the defect, threading each of the arms of these pre placed stitches through a suitable sized pledget of compressed poly vinyl sponge (Ivalon) and then tying In the atrioventricularis commun is lesions reconstruction of the malformed mitral and/or tricuspid valves by means of interrupted stitches of fine silk supplemented by polyvinyl sponge where necessary is an important essential for success In all of the tetralogy of Fallot lesions with severe degrees of infundibular ob struction associated with hypoplasia of this region the infundibular mus cle resection is supplemented by widening of the right ventricular out flow tract by insertion of a roof of compressed polyvinyl sponge into this portion of the ventriculotomy incision as it is closed

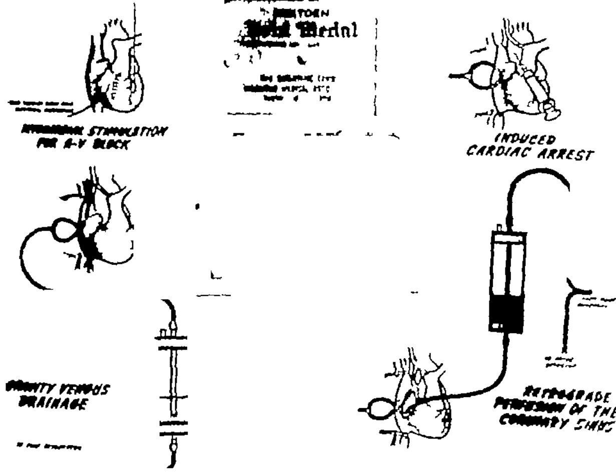
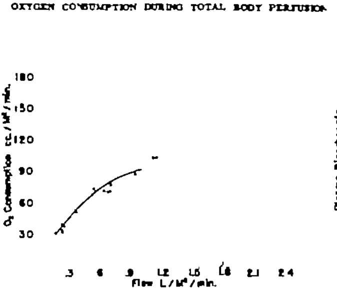
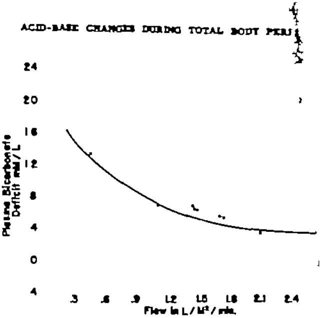


Figure 5 depicts some of the technical adjuncts to total body perfusion employed In the upper lefthand corner of this figure the method of implantation of a myocardial electrode for use with the electrical pacemaker in the treatment of postoperative heart block is shown Since the development and introduction of this method (usually supplemented by the previously described Isuprel therapy) the mortality of surgically induced complete atrioventricular dissociation has decreased precipitously from its previously high levels to almost zero In the lower left are shown the details for gravity drainage of the venous blood from the venae cavae This technique is routinely used In some cases with large and complex intracardiac deformities it is advantageous to stop the heart by the injection of potassium citrate or acetylcholine into the coronary system as indicated in the diagram in the right upper corner In other instances such as the surgical correction of aortic valvular disease it has been found distinctly advantageous to supply the myocardium with oxygenated blood in a retrograde fashion during the interval that normal coronary perfusion is interrupted This method of retrograde coronary perfusion is shown in the lower right diagram In certain patients [illegible] cardioplegic agents has been added to the blood [illegible] coronary sinus so that the heart is motionless [illegible]



Oxygen consumption at low perfusion rates during total body perfusion is reduced below the basal requirements under anesthesia As the perfusion rate is increased oxygen consumption rises Oxygen consumption reaches the basal level at a perfusion rate of about 1200 cc per square meter per minute Raising the perfusion rate above this level gives no further increase in oxygen consumpton

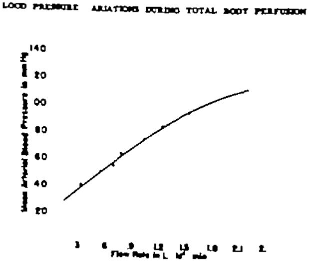
A



Plasma bicarbonate loss which occurs during total body perfusion is less as the perfusion rate is increased Above a perfusion rate of 1200 cc per square meter body surface area per minute the extent of losses remains constant in spite of an increasing perfusion rate

B

C



Blood pressures during perfusion vary with the perfusion rate With per fusion greater than 1200 cc per square meter per minute systemic pressures are generally maintained above 80 mm Hg

Figure 6 During total body perfusion with cardiopulmonary bypass certain rather consistent physiologic alterations occur with respect to acid base balance These changes in part, are related to the rate and duration of perfusion and the patient's preoperative status (cyanotic or acyanotic) During all bypasses the perfusion rates are determined by continuous observation of the systemic arterial blood pressure (by a fine polyethylene catheter in the internal mammary artery) and the electroencephalogram Flow rates between 50 to 75 cc per kg of body weight generally maintain these functions unaltered Several of these important correlations are graphically demonstrated in Figure 6 A B C

RESULTS OF OPEN CARDIAC SURGERY

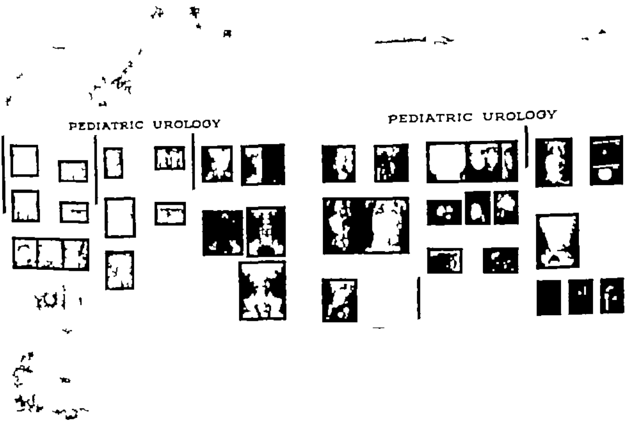
RESULTS IN LAST 35 OPEN INTRACARDIAC OPERATIONS CONSECUTIVELY PERFORMED UTILIZING TOTAL CARDIOPULMONARY BYPASS
University of Minnesota 1957

LESION	PROCEDURE	DURATION OF PERFUSION (Range) min	INDUCED ASYSTOLE Patient no	PATIENTS	MORTALITY
Ventricular Septal Defect	Closure	12-40	11	13	0
Atrial Septal Defect	Closure	16-29	0	7	0
Tetralogy of Fallot	Complete correction	38-72	8	8	1
Aortic Stenosis (congenital)					
Valvular	Valvotomy	12-20	2	2	0
Subvalvular	Excision stenosis	14	0	1	0
Mitral Regurgitation (rheumatic)	Valvular reconstruction	22-29	0	2	0
Isolated Infundibular Pulmonic Stenosis	Excision stenosis	16	0	1	0
Single Ventricle	Insertion of septum of Ivalon	62	1	1	0
				35	1

In many instances those efforts were directed primarily toward the correction and even cure of previously inoperable lesions As a consequence many of the patients have been seriously ill prior to surgery Moreover both new surgical techniques and knowledge of the physiology of total body perfusion in man had to be developed and tested Even so the risks even during the beginning periods was not at all discouraging when the results were examined In these 350 patients ranging in age from 6 weeks to 66 years the majority are completely cured thanks to the accuracy that visual methods give to surgical technique In addition a study of the failures has contributed importantly to the increased knowledge that has made possible the gratifying reduction of operative risk for open heart surgery to its present low levels Thus for the last 35 patients of this series of 350 undergoing open cardiotomy for various lesions there was only one death or a mortality of less than 3%

Pediatric Urology Sam G Jameson James O Cooper and J Schuler Mc Kinney El Dorado Ark.

Numerous pediatric urological cases are presented in a brief but con cise manner by x-rays color transparencies, and legends. Cases presented exemplify congenital anomalies obstructive uropathy infection tumor and trauma This exhibit is especially valuable for the generalists and the pediatricians as the indication for urological investigation is indicated in each case



Many urological symptoms are over looked in children, only to later reappear in adult life associated with irreparable damage to part or all of the urinary tract The authors feel that the relatively high incidence of pediatric urological pathology is frequently not generally realized, but proof of this high incidence is submitted by the fact that the following cases (with two exceptions) and numerous other cases not presented in this exhibit, were discovered in a four year period in only three counties in Arkansas with total population of only 130,000 The short history accompanying each case summarises the presenting symptoms, physical finding and/or urine finding indicating urological examination

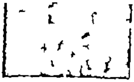


Retrograde cystogram showing bladder dilatation without influx

CASE 1

Female age 7 with recurrent pyuri frequency and enuresis in spit of antibiotics and chemoth rapy U ological examination revealed bladder neck obstruction for hich transurethral resec tion was done.

Tissue Removed from Bladder Neck



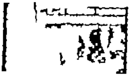
CASE 2



Female age 2½ with hronic pyuri diurnal enuresis and nocturnal enuresis in spite of antibiotics and chemotherapy Urological examination revealed bladder neck contracture for which transurethral resection was done.

Retrograde cystogram showing trabeculation with slight left ureteral reflux.

Tissue from Bladder Neck



Retrograde cystograms on other children w th similar symptoms who were found to have bladder neck or urethral obstruction.



CASE 3

Female, age 11 with bladder trabeculation No reflux.



CASE 4

Male, age 6, with blad der dilatation N re- flux.



CASE 5

Female, age 2, with bilateral reflux.



CASE 6

Female, age 2½, with bilateral reflux.



CASE 7

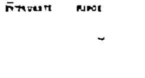
Female, age 3 months, with bladder dilatation and bilateral reflux.



CASE 8

Female age 6, with left reflux.

CASE 9



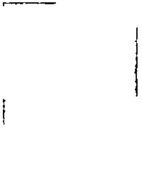
Male, ge 14, with long standing history of strain ing to void, pyuria, and marked generalized underdevelopment. Autopsy revealed irreparable damage left kidney and ureter secondary to bladder neck contrac ture and marked hypertrophy of interureteric ridge. Right kidney was hypoplastic.

CASE 10

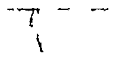


Female, age 5, with straining to void, getting clothes wet after voiding and nocturnal enuresis. External genitalia revealed fusion of labia, which caused incomplete emptying of bladder with portion of voided urine being left in vagina until she stood erect after voiding. Permanent separation of labia was performed.

CASE 11



IVP showing normal left kidney Right kid ney was hypoplastic and non functioning.



HYPOPLASTIC KIDNEY

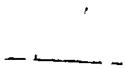
Female age 7 complaining that underclothes stayed slightly damp at all times, even immediately after voiding. Urological examination revealed right ureteral orifice ectopically opening into vagina Right nephrectomy was per formed which revealed hypoplastic kidney

CASE 12

Male age 8 months, with complete nuria f llowing episode of diarrhea. Urological examination revealed congenital absence of left kidney and ureter with right kidney and ureter blocked by uric acid crystals (precipitated secondary to dehydration and acidosis during diarrh a) After dissolving crystals with irriga tions of sodium bicarbonate and intravenous sodium lactate, further examination revealed congenital stricture f ureteropel vic junction w th resulting hydronephrosis for which ureterocalyceal anastomosis was performed.

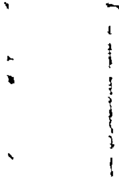


CASE 13



Male, age 3, with recurrent abdominal pain, albuminuria, and microscopic hematuria. Found to have stricture of ter minal ureter bilateral, for which bilateral ureteral reimplantation done.





CASE 14

[illegible] Serial [illegible] abnormality [illegible] of right [illegible] pelvis and calyces. [illegible] would [illegible] to be [illegible] displaced upward by [illegible] first [illegible] which [illegible] elevated [illegible] ... allowed [illegible] to assume normal position and course without compression.

CASE 15

[illegible]

CASE 16





CASE 16

CASE 18



[illegible] with mild persistent [illegible] Urological examination revealed [illegible] ... and [illegible] ... [illegible] resulting from infection.

CASE 17

[illegible] with persistent [illegible] left [illegible] Found [illegible] compression [illegible] ... [illegible] Surgical [illegible]

CASE 18

[illegible]

NON URINARY TRACT ANOMALIES ASSOCIATED WITH URINARY TRACT ANOMALIES



CASE 1

Female, age 6, with menin gocele and spina bifida. Retograde cystogram reveals neurogenic bladder



CASE 2

Male, age 13 months with cleft palate and glandular hypospadias. No urinary symptoms. IVP done because of these two external abnor malities, revealing hydroureter and early hy dronephrosis, secondary to congenital stricture of uretero-vesical junction.



CASE 3

Male, age 11 months, with partial to complete absence of musculature of left flank and abdominal wall, associated with other skeletal defects. No urinary symptoms. Urological ex amination done because practically every per son with abdominal wall defect has associated urinary tract abnormality Examination revealed congenital absence of left kidney and ureter with dilated right ureter ectopically opening into seminal vesicle Surgical correction consisted of implantation of right ureter into bladder

TRAUMA

Male ag 10, with abdominal mass and gross, total hematuria following fall. IVP revealed medial deviation of right urete and kidney secondary to retroperi toneal hematoma. *Left kidney was congenitally mal rotated* Child did well on conservative regimen. Because congenital nomalies of urinary tract are more susceptibl to injury every injury should be carefully investigated, not only to determine extent of injury but to determine whether congenital anomalies are present.



ABDOMINAL MASSES

CASE 1



4 hour IVP



Pyelogram before Pyeloureteroplasty



Left pyelogram after Pyeloureteroplasty

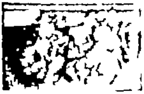
Autopsy specimen on above child







Male, age 21 months, with larg mass palpable on each side of bdomen extending into each flank. IVP revealed bilateral gia t hydronephrosis for which bilateral nephrostomy was performed. After stabilization of kidney function, left pyeloureteroplasty was performed. In spite of essentially satisfactory pyelographic result child developed bilateral pyelonephritis, which with markedly decreased kidney function, caused his death.



CASE 2

Premature female, age 10 days, weight 3 pounds 15 ounces, with left bdominal and flank mass. IVP and retrograde pyelogram not diagnostic. Surgical exploration revealed left mul ticystic kidney with right kidney nor mal. Uneventful recovery after neph rectomy



CASE 3

Male, age 8, with large left flank and bdominal mass. IVP revealed non-functioning left kidney. Right pyelogram normal. Surgical exploration revealed left polycystic kidney with right kidney grossly normal. Uneventful recovery after nephrectomy



CASE 4

Male, age 3 with recurrent abdominal pain. Repeated urinalyses negative. Careful palpation of abdomen revealed mass in RUQ, found to be right hydronephrosis due to stricture of uretero-pelvic junction. Surgical repair of stricture done.

CASE 5

Female, age 7 with huge abdominal and flank mass. IVP not diagnostic. Retrograde pyelogram revealed compression deformity and caudad displacement of right kidney. Left kidney normal. Thoraco-abdominal nephrectomy was begun, but prior to opening pleural cavity child developed cardiac arrest. Cardiac massage restored heart activity for several minutes, but she expired shortly thereafter. Autopsy revealed regional node involvement.



WILM'S TUMOR



Autopsy specimen of above child

DETOXICATION MECHANISMS

When a foreign organic substance is injected into the body the resultant effects are concerned with the following

1. Chemical nature, quantity and solubility of the substance

2. Status of organs, especially liver and kidney functions

3. Adequacy of biochemical systems in transformation, destruction or elimination of injected substance accomplished by syntheses, conjugations, methylations, etc These are mainly enzymatic actions of hydrolysis, oxidation, reduction, activation, degradation, inhibition, etc

4. Defense of chemical pattern of body-fluids in acid-base and osmotic mechanisms (buffering)

THE ABOVE CHEMICAL DEFENSE MECHANISMS ARE OF LIMITED CAPABILITIES
There is the possibility that the above chemical changes may result in a product more toxic than the original one

The influence of biochemical individuality may also be a factor

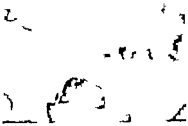


CASE 4

Male, age 3, with recurrent abdominal pain. Repeated urinalyses negative. Careful palpation of abdomen revealed mass in RUQ, found to be right hydronephrosis due to stricture of uretero-pelvic junction. Surgical repair of stricture done.

CASE 5

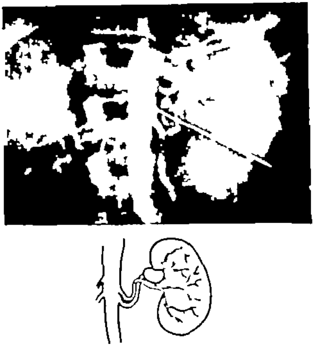
Female, age 7 with huge abdominal and flank mass. IVP not diagnostic. Retrograde pyelogram revealed compression deformity and caudad displacement of right kidney Left kidney normal. Thoraco-abdominal nephrectomy was begun, but prior to opening pleural cavity child developed cardiac arrest. Cardiac massage restored heart activity for several minutes, but she expired shortly thereafter Autopsy revealed regional node involvement.



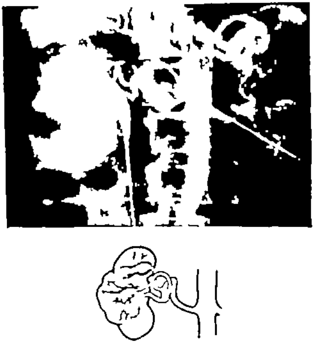
WILM'S TUMOR



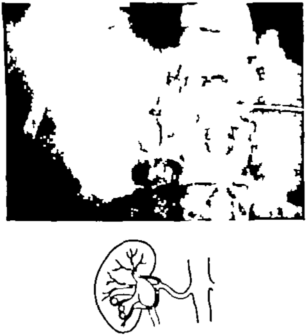
Autopsy specimen of above child



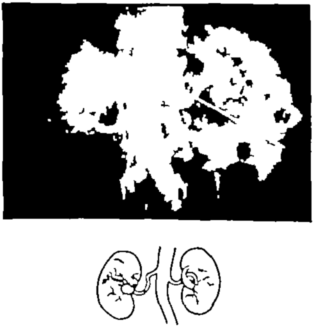
CONGENITAL CALCIFIED ANEURYSM BRANCH OF LEFT RENAL ARTERY ON UROGRAM THE CALCIFICATION APPEARS TO BE INSIDE THE KIDNEY



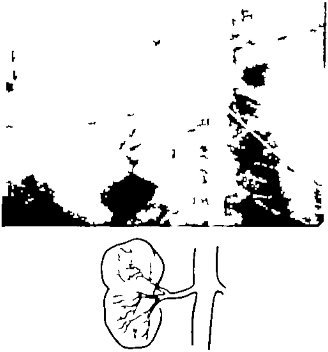
ASYMPTOMATIC SPACE FILLING LESION RIGHT KIDNEY



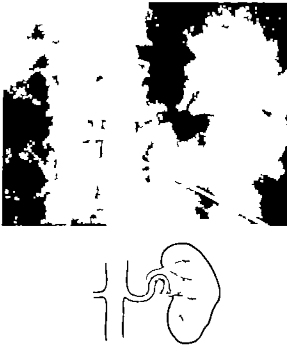
INTERMITTENT HYDRONEPHROSIS CAUSED BY PARTIAL OBSTRUCTION BY BRANCH OF RENAL ARTERY



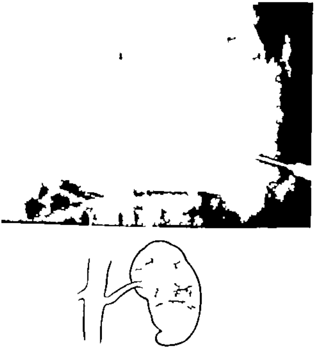
42 YEAR OLD WOMAN WITH HYPERTENSION FOR 8 YEARS CONGENITAL CALCIFIED ANEURYSM RIGHT RENAL ARTERY POST STENOTIC ANEURYSM BRANCH OF LEFT RENAL ARTERY



ASYMPTOMATIC TUMOR UPPER POLE RIGHT KIDNEY TRANSDIAPHRAGMATIC APPROACH PREFERABLE



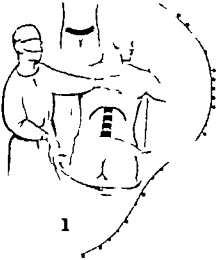
MEDIAL CALCIFIC SCLEROSIS LEFT RENAL ARTERY CALCIFICATION RE SEMBLES AN ANEURYSM



PAINLESS TOTAL HEMATURIA NONFUNC TIONING LEFT KIDNEY ON UROGRAM UNABLE TO PERFORM RETROGRADE PYE LOGRAPHY ANGIOGRAM SHOWS RENAL TUMOR



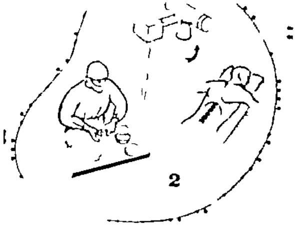
40 YEAR OLD WOMAN WITH BENIGN HY PERTENSION TREATED BY EXCISION AND END TO END ANASTOMOSIS



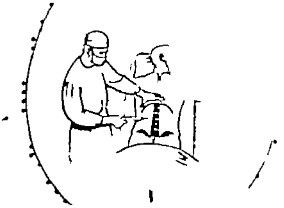
1

PATIENT IS PRONE PAD (a) IMPEDES FLOW OF BLOOD THROUGH ILIACS WHEN STRAP (b) I TIGHTENED

X RAY UNIT IS SWUNG OUT OF WAY WHILE LOCAL ANES THESIA IS GIVEN AND AOR TIC TAP MADE



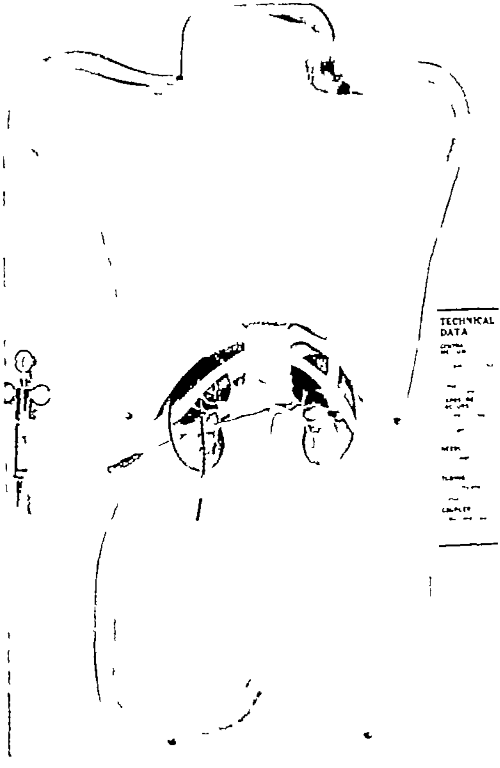
2



1

NOVOCAINE INFILTRATION OF SKIN AND MUSCLE LAYERS

TECHNIC





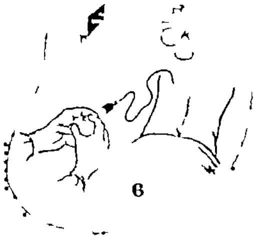
4

AORTA TAPPED WITH #18 GAUGE 7 LONG NEEDLE NEAR LOWER PART OF 1st LUMBAR VERTEBRA

NEEDLE IS FLUSHED TO BE SURE END IS IN LUMEN OF AORTA



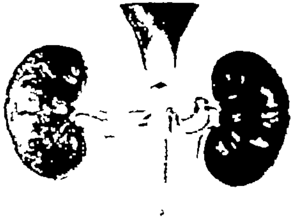
5



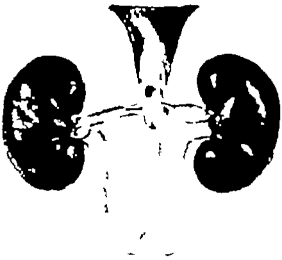
6

USE PLASTIC TUBING 30 LONG (TO SAFEGUARD HANDS FROM X-RAY EXPOSURE) SCOUT FILM MADE USING 10 CC 25% HYPAQUE TO DETERMINE NEEDLE POSITION THEN 50% HYPAQUE AS LAST 3CC OF FLUID IS BEING INJECTED X RAY IS TAKEN

INDICATIONS



ATHEROMATOUS PLAQUE
WITH POST-STENOTIC ANEURYSM



BILATERAL STENOSIS FROM
FIBROUS INTIMAL PROLIFERATION

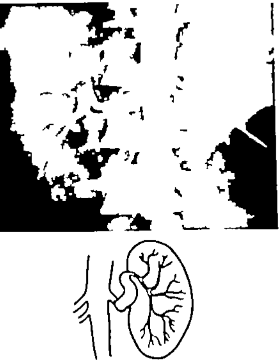
INDICATIONS FOR RENAL ANGIOGRAPHY IN HYPERTENSION

PATIENTS UNDER 35 YEARS OF AGE WITH NEGATIVE FAMILY HISTORY AND NO APPARENT CAUSE OF HYPERTENSION

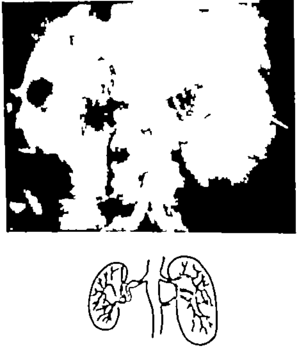
PATIENTS OVER 60 YEARS OF AGE WITH SUDDEN ONSET OF ACCELERATED OR MALIGNANT HYPERTENSION

PATIENTS WITH ESSENTIAL HYPERTENSION WHOSE DISEASE ACCELERATES AFTER AN ATTACK OF FLANK PAIN

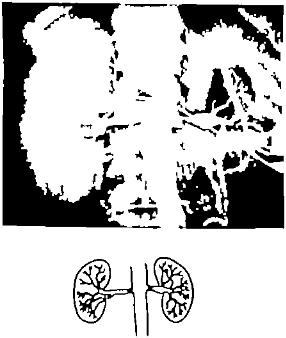
PATIENTS WHO SHOW UNEXPLAINED DISPARITIES OF SIZE OR FUNCTION OF THE KIDNEYS DURING INTRAVENOUS UROGRAPHY



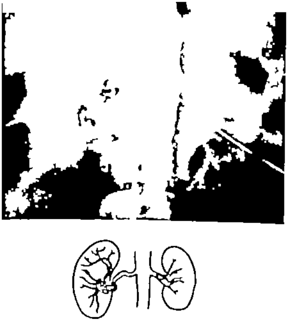
32 YEAR OLD MAN WITH RECENT ONSET OF MALIGNANT HYPERTENSIVE SYNDROME RELEIVED OF HYPERTENSION BY NEPH RECTOMY (DEATH 10 MONTHS LATER CORONARY THROMBOSIS)



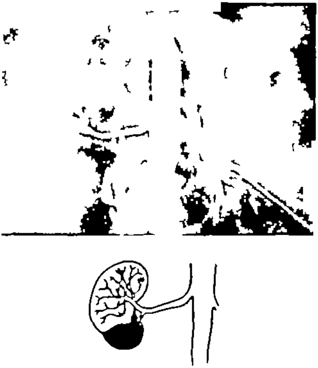
24 YEAR OLD WOMAN WITH HYPERTENSION 7 YEARS ARTERIOSCLEROSIS BOTH RENAL ARTERIES RENAL BLOOD FLOW ON RIGHT 237 ml PER MINUTE ON LEFT 544 ml PER MINUTE



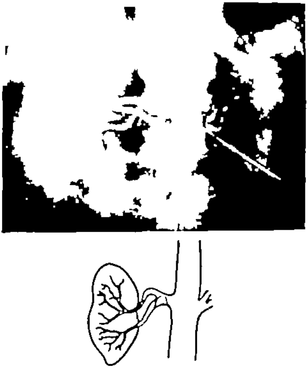
15 YEAR OLD BOY WITH HYPERTENSION FROM STENOSIS OF BOTH RENAL ART ERIES RELEIVED OF HYPERTENSION BY BILATERAL ARTERIAL HOMOGRAFTS (FOLLOWED FOR 20 MONTHS)



54 YEAR OLD WOMAN WITH HYPERTENSION 15 YEARS RECENT ONSET OF MALIGNANT HYPERTENSION RELEIVED OF HYPER- TENSION BY NEPHRECTOMY AND ANTI- PRESSOR DRUGS



28 YEAR OLD MAN WITH HYPERTENSION FOR 4 MONTHS RELEIVED OF HYPER TENSION BY NEPHRECTOMY (FOLLOWED FOR THREE YEARS)



50 YEAR OLD MAN WITH ACCELERATED HYPERTENSION 2 YEARS DURATION BLOOD PRESSURE 210/120 RELEIVED OF HYPERTENSION BY NEPHRECTOMY (FOLLOW UP 8 MONTHS)



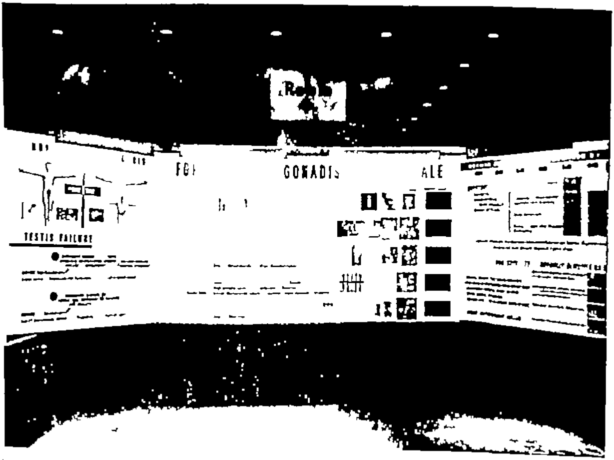
29 YEAR OLD WOMAN WITH HYPERTENSION (BLOOD PRESSURE, 220/110) FOR THREE YEARS RELEIVED OF HYPERTENSION BY NEPHRECTOMY (FOLLOW UP ONE YEAR)

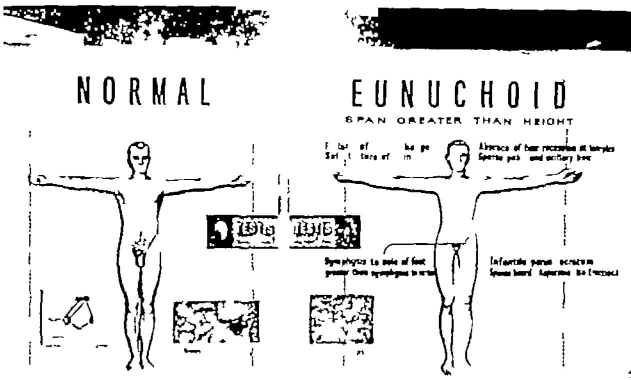


11 YEAR OLD GIRL WITH MALIGNANT HYPERTENSION FROM BILATERAL PYE LONEPHRITIS REMISSION OF MALIG NANT SYNDROME BY RIGHT PARTIAL NEPHRECTOMY AND LEFT TOTAL NEPH RECTOMY

Hypogonadism in the Male Arthur A. Roth Western Reserve University Cleveland City Hospital and Mount Sinai Hospital Cleveland

This is a clinical study showing the various known forms of hypogonadism in the male The exhibit comprises drawings of normal and hypogonadal males, the various syndromes of hypogonadism photographs of patients in each syndrome microphotographs of testis biopsies in each group the relative size of the testes, studies of cryptorchidism and the infertile and sterile male testis.





TESTIS FAILURE

◯ TO PRIMARY DISEASE OF THE TESTIS ANORCHIA OR PREPUBERAL ATROPHY OR FAILURE OF DEVELOPMENT } with small stature and occasionally tall development

URINE *High Gonadotropins* ↗

Low or normal 17 Ketosteroids ⟶ Postpuberal — } with tall or normal stature

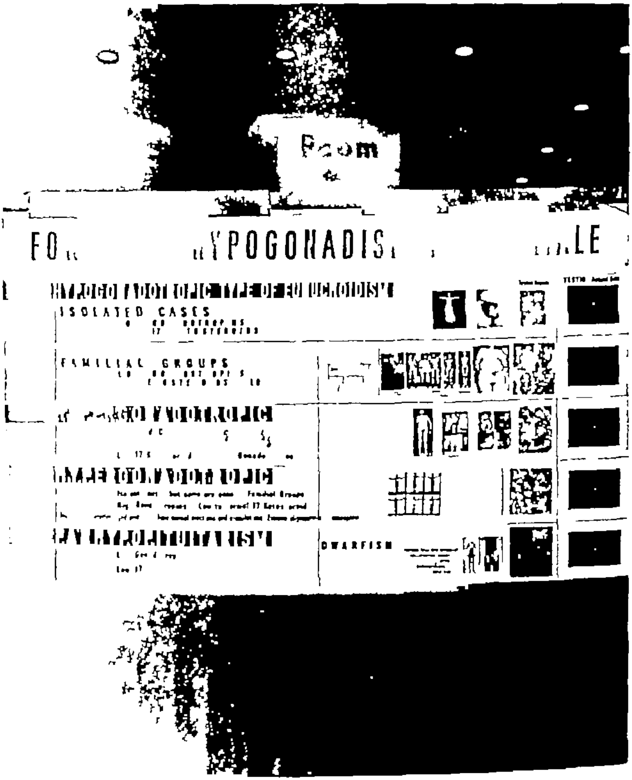
◯ TO SECONDARY DISEASE OF THE TESTIS AND DEPENDENT ON ANTERIOR PITUITARY FAILURE

URINE Low Gonadotropins ↗

Low 17 Ketosteroids ⟶ Tall Prepuberal Type Familial Types

The panel at the left shows the diagramatic proportions of a normally developed male with normal male sexual development and those of a male with eunuchoidal skeleton and body conformation Also shown are the relative size of the testes and the marked difference between them in gross size and histological section

The lower section of this panel amply demonstrates and explains the difference between testis failure which is primary in that organ with out involvement of the pituitary and that failure of the testis which is secondary to pituitary failure



Room
POGONADIS
ISOLATED CASES
FAMILIAL GROUPS
DWARFISM

The center panel of this exhibit shows in the two upper sections hypogonadotropic eunuchoidism therefore secondary to pituitary failure in isolated and familial groups In the familial group presented here there were four brothers with a normal brother and a sister who was sexually normal but obese In the latter group signs were present which permitted their classification in the Laurence-Moon-Biedl Syndrome

The hypergonadotropic sections of this panel describes two new recently described syndromes with high urinary gonadotropins The Klinefelter syndrome and that of Functional Prepuberal Castration in males are part of this category

This panhypopituitary section shows hypo gonadism and eunuchoidism secondary to complete pituitary failure

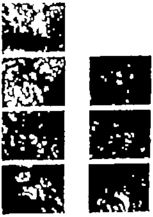
NORMAL TESTIS DEVELOPMENT FROM BIRTH

1 MO 1 YR	6 YRS	10 YRS	12 YRS	13 YRS	18 YRS

CRYPTORCHIDISM

GROWTH AND DEVELOPMENT OF TESTIS NORMALLY BEGINS AT 5 YRS

- Aplasia of Germ Cells in prepuberal years
- Comparison on Descended and Cryptorchid testis at puberty
- Same Comparison age 16
- Biopsy 18 years after Bilateral Orchiopexy



A P L injection treatment should be given a trial in both Unilateral and Bilateral Cryptorchidism
Surgery not to be delayed beyond 6 7 years of age

INFERTILITY AND STERILITY IN NORMALLY DEVELOPED MALES

NORMAL VALUES FOR SEMEN ANALYSIS

- ° HIGH DEGREE OF SPACE GAINING TYPE OF MOTILITY 60-80%
- MORPHOLOGY NORMAL IN 80% OR MORE
- SPERM COUNTS 20,000,000/CC AND UP
- VOLUME 3 5 CC WITH EXTREME RANGE OF 1-6 CC

° *MOST IMPORTANT VALUE*

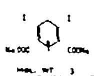
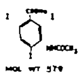
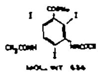
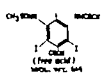
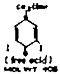
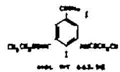
- Active Spermatogenesis with sloughing of immature cells Low Sperm Count
- Spermatogenic Arrest at Primary Spermatocyte stage, moderate Fibrosis of Tubules involving Tunica propria and basement membrane
- Aplasia of Germ Cells (Adult Life)
- Incomplete Germinal cell arrest – occasional sperm



The last section of this exhibit shows the development in gross size of the testis from birth with the usual rapid development of testis size at the time of the growth spurt of puberty Since we believe that the testis begins to develop at about five years of age we are advocating definitive therapy for the undescended testis at an earlier age than heretofore recommended The histology of representative cases having cryptorchid testes and biopsy at time of surgery are shown

In the last section various forms of male infertility and sterility are detailed by testis biopsy In addition the normal values of semen analysis are given with motility patterns and percentages deemed the most important value

COMPARISONS - UROGRAPHIC MEDIA

Ge l N me	Sodl m Iodomethamate	Sodium Acetrizoate	Sodium Diatrizoate	Sodium and Methylglucamine Diatrizoate	Iodopyracet	Diprotri oate Sodium
T ade Nam	Neo Iopax	Urokon	Hypaque	Renografin	Diodrast	Miokon
Cheml l Name	Disodium 1-methyl 3,5 diiodo-4 pyridone 2,6 dicarboxylate	Sod m 3 acetylamino 2 4 6, 1 liodoben oate	Sodium 3 5 - diacetylamino-2,4 6 triiodobe oate	Sodium & methylglucamine salts of 3,5-diacetylamino-2,4 6 triiodobenzoic acid	3,5 diiodo -4 pyridone N cetic acid	Sodium salt of 3,5 dipropionylamino-2,4,6 triiodobenzoic acid
% Iod ne by weight (dry)	51 5%	65 8%	59 87%	48 7%	50%	57 3%
% S lution Used	50% (75%)	50% (30% 70%)	50%	60% & 76%	35%	50%
Usual amount of solution injected	20 cc.	25 cc	30 cc.	20 cc	30 cc	30 cc
Amount Iodine I ject d	5 2 gm.	8 225 gm	8 979 gm.	7 36 gm	5 25 gm	8.58 gm
Specific Gravity	1 335	1 335	1 3204	1 422	1 19	
Basic Chemical Structure						
CRYSTALLINE APPEARANCE						

FACTORS INFLUENCING QUALITY OF UROGRAMS

1. *AGE* – Films are poor until about two months of age
2. *PREPARATION OF PATIENT*
3. *ROENTGEN TECHNIQUE*
4. *RENAL FUNCTION* – State of activity of calyces pelves and ureters
5. *ph of URINE* — Evident with diodrast
6. *ANION, CATION & XANTHINE EFFECTS*
7. *RADIODENSITY* – Dependent on iodine only to level of capacity of kidney to excrete iodine

ANION-CATION INFLUENCE

On Radiodensity of Intravenous Urograms (IODOPYRACET) in 1468 Patients

Series	Additional Preparatory Measures	Total Number Cases	Number Unsatisfactory	Per Cent Unsatisfactory	Number Satisfactory	Per Cent Satisfactory
I	NONE	423	136	32 1	287	67 9
II	$NaHCO_3$	550	116	21 0	434	79 0
III	$NaHCO_3$ + Caf. Sod. Benz.	107	12	11 2	95	88 8
IV	$KHCO_3$	38	15	39 4	23	60 6
V	Sod Citrate	27	8	29 6	19	70 4
VI	Pot Citrate	14	5	35 7	9	64 3
VII	$NaHCO_3$ + Sod Citrate	19	6	31 5	13	68 5
VIII	Citro carbonate	248	86	34 6	162	65 4
IX	NH_4Cl + Mandelic Acid	42	29	69 0	13	31 0

TERMS 'SATISFACTORY' OR 'UNSATISFACTORY' = SUFFICIENTLY OR INSUFFICIENTLY RADIOPAQUE FOR DIAGNOSTIC PURPOSES FINER VARIATIONS IN RADIOPACITY NOT SHOWN

THEORETICAL EXPLANATION OF EFFECTS OF SODIUM BICARBONATE & CAFFEINE SODIUM BENZOATE IN INTRAVENOUS UROGRAPHY

— Correction of Mild Acid-Base Imbalance of F-D*
(decrease in blood CO_2 in 1st 24 hrs approx 4 to 10 vols %)

— Correction of Na-K Urinary Excretion Ratio
(Na falls to low level in F-D*)

Na^+ / HCO_3^-

— Factor in Excretion of Keto Acids (accumulate in F-D*)

— Factor of Improved Na Tubular Reabsorption
(a) Interruption of Na Reabsorption by Mercurial Diuretics Given Shortly Before IVP Results in Poor Radiodensity of Urograms
(b) Use of $KHCO_3$ Results in Decreased Radiodensity Evidently Due to Excess of K-ION

— Prevents or Dissolves Precipitates of Acid-Sensitive Contrast Media (in vitro exp with keto acids)

Result (1) Improvement in Urogram Radiodensity (with Diodrast)
(2) Possible Prevention of Some Reactions (by improved media-solubility and correction of F-D* acidosis)

CAFFEINE SOD BENZOATE
— Mechanism Stated to be Uncertain
— Possible Increase In Glomerular Filtration Through Vasomotor Effects

Result Marginal Improvement in Urogram Radiodensity

* F D STATE OF FASTING-DEHYDRATION

CLASSIFICATION AND THEORETICAL EXPLANATION OF REACTIONS

I ALLERGIC

A Histamine release

1. Erythema
2. Angioneurotic Edema
3. Laryngo & Bronchospasm
4. Anaphylaxis (possible conjugation with protein)

B Heparin formation

Hemorrhagic effects such as purpuriform lesions, bleeding from mucous membranes, lysis of platelets

II. DRUG IDIOSYNCRASY

III IODISM

Low threshold or supersaturation of I

IV PHYSICO-CHEMICAL

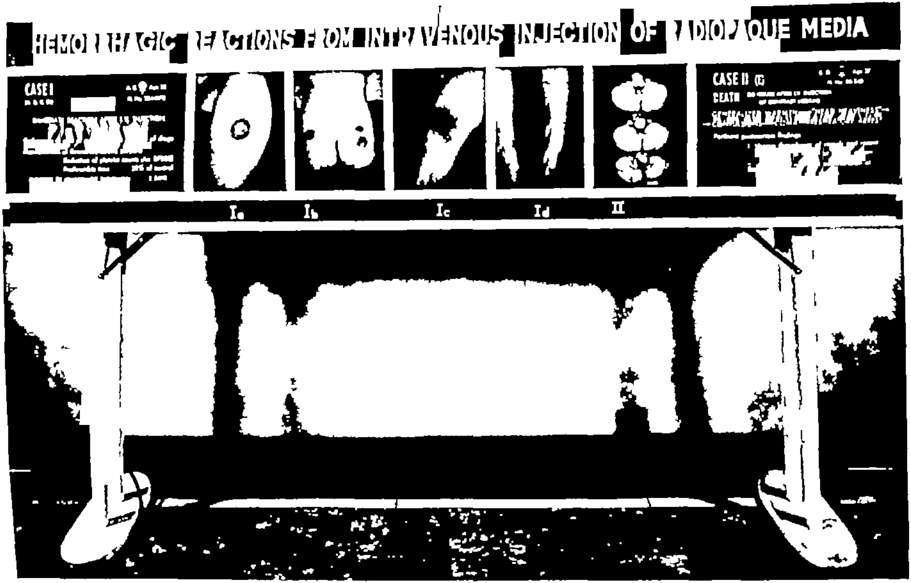
- **A** Speed of injection
- **B** Hypertonicity of solution
- **C** pH effects (wide variations concern solubility of media & enzyme stability)
- **D** Cholinergic response due to trans-methylation to choline derivatives

V. PSYCHIC DISTURBANCES

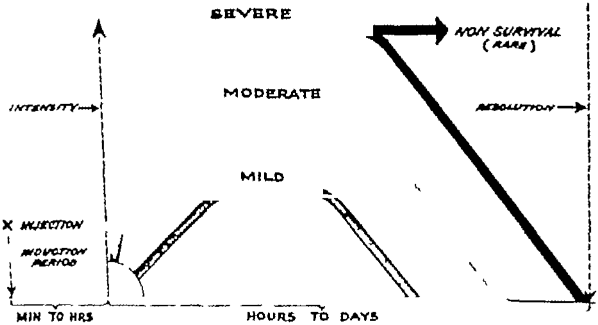
...revealed by 200 saline controls

VI VARIOUS COMBINATIONS

of the above factors - Sensitivity to one opaque media does not necessarily indicate sensitivity to all such media Therefore, different opaque solutions should be available for further testing


HEMORRHAGIC REACTIONS FROM INTRAVENOUS INJECTION OF RADIOPAQUE MEDIA
CASE I
CASE II
DEATH
Ia
Ib
Ic
Id
II

PATHS OF REACTIONS



REACTION-PATTERNS REPRESENT SUMMATION OF EFFECTS BY VARIOUS FACTORS ON SKIN, CARDIOVASCULAR, RESPIRATORY & NERVOUS SYSTEMS EITHER SEPARATELY OR COMBINED MAJORITY OF REACTIONS ARE MILD OF THESE 10% (USUALLY EVIDENCED BY VASOMOTOR CHANGES) ASSIGNED TO PSYCHOGENIC CAUSE AS PROVEN BY NORMAL SALINE CONTROL INJECTIONS

To Minimize Incidence of Reactions

1. Observe contraindications
2. Avoid indiscriminate use of opaque media through proper evaluation of the patient and test procedure
3. Employ a slow rate of injection
4. Do Not proceed in the face of a positive reaction to IV test dose

   It would be an unwarranted risk to challenge the patient further by employment of the full dose Experience reveals that it is far safer to employ a 10% rather than the concentrated solution for the IV test dose

DETOXICATION MECHANISMS

When a foreign organic substance is injected into the body the resultant effects are concerned with the following

1. Chemical nature, quantity and solubility of the substance

2. Status of organs, especially liver and kidney functions

3. Adequacy of biochemical systems in transformation, destruction or elimination of injected substance accomplished by syntheses, conjugations, methylations, etc These are mainly enzymatic actions of hydrolysis, oxidation, reduction, activation, degradation, inhibition, etc

4. Defense of chemical pattern of body-fluids in acid-base and osmotic mechanisms (buffering)

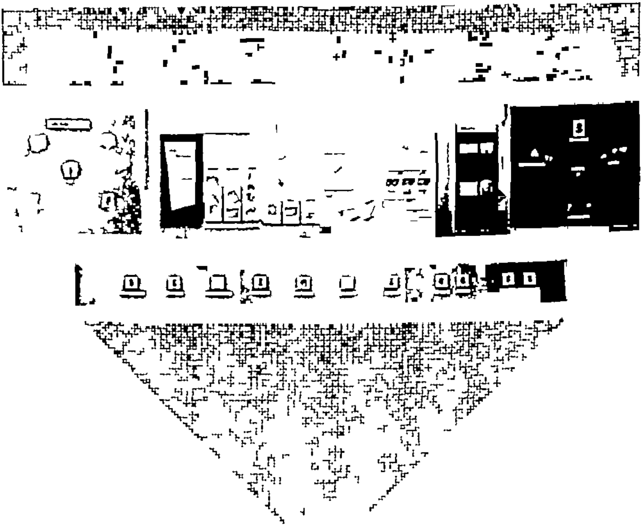
THE ABOVE CHEMICAL DEFENSE MECHANISMS ARE OF <u>LIMITED</u> <u>CAPABILITIES</u>

There is the possibility that the above chemical changes may result in a product more toxic than the original one

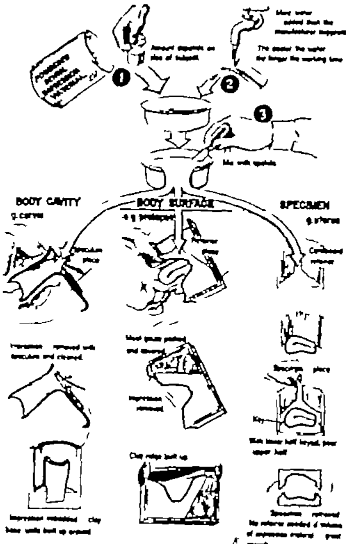
The influence of biochemical individuality may also be a factor

Gynecological Teaching Models Made with a Self Curing Acrylic. W C. Keettel J H Randall and Paul V Ver Vals State University of Iowa College of Medicine Iowa City

This exhibit is concerned with the creation of models made with self curing Acrylic, and presents the advantages of such models for teaching and display purposes. It describes through the method of making impressions of surgical specimens vagina cervix, and external impression of the vulva prolapsed uterus etc. It shows how to make the plastic cast from the impression and how to prepare and use the plastic painting mediums. Completed models of the conditions mentioned are shown including the history of each case



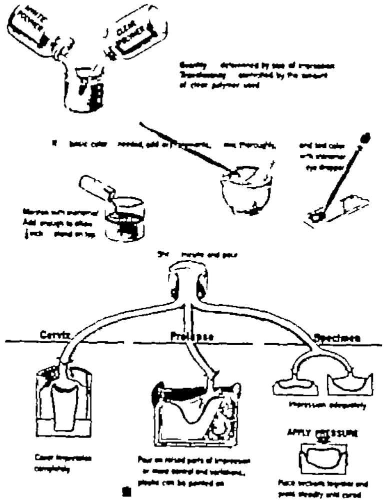
MAKING THE IMPRESSION



THE IMPRESSION IS WRAPPED ... MOIST CLOTH TO AVOID SHRINKAGE DUE TO WATER LOSS.
THE CAST SHOULD BE MADE THE SAME DAY THE IMPRESSION IS TAKEN

PREPARING AND POURING PLASTIC

We use a self-curing acrylic for our models. This plastic consists of a bottle of liquid MONOMER, a jar of powder called WHITE POLYMER, and a jar of powder called CLEAR POLYMER. When the monomer and polymer are mixed in prescribed proportions, the setting time is about 15 minutes. More monomer—more working time.

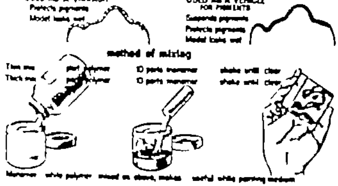


PLASTIC PAINTING MEDIA

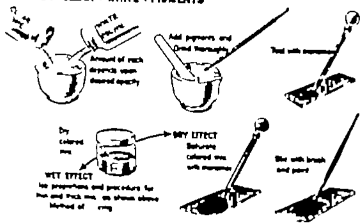
MONOMER + DRY POWDER PIGMENTS

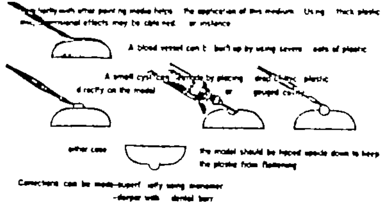


MONOMER + CLEAR POLYMER

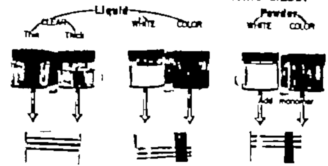


MONOMER + CLEAR + WHITE + PIGMENTS





DEMONSTRATION OF PLASTIC PAINTING MEDIA



We have found plastic models more practical than wax models for our purpose. The materials may be purchased at art and dental supply houses. No elaborate equipment is needed for processing. The cost of a model is relative to the desired effect.
Three models

- *resist heat*
- *can be handled freely and do not scratch easily*
- *do not lose color when washed*
- *can be made to look wet or dry*
- *can be made hollow or solid*
- *some modelling can be achieved with painting media*
- *changes and repairs are easily made*
- *run the gamut from transparent to opaque*
- *are bench cured (no heat or pressure required)*



1. Cervical Polyp and Nabothian Cysts



2 Endocervical Polyp



3 Submucous Fibromyoma in Cervix



4 Carcinoma of Cervix



5 Carcinoma of Cervix



6 Carcinoma of Cer ix



7 Endometriosis

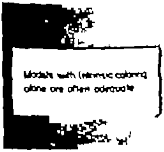


8. Cervical Erosion



9 Post Ca tery

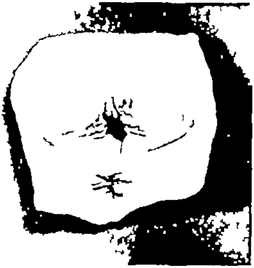
PROLAPSE OF UTERUS







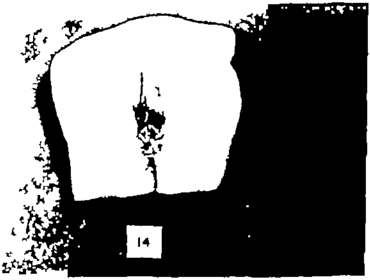
CARCINOMA OF VULVA



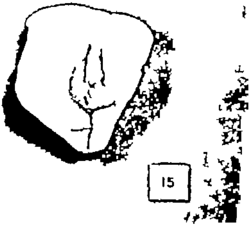
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13



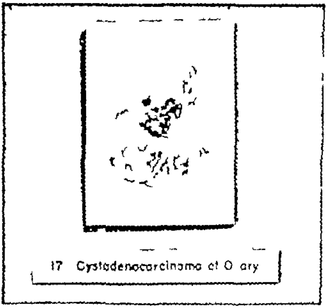
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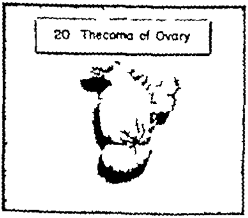
15



16



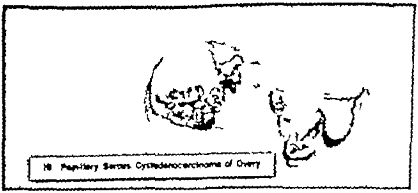
17 Cystadenocarcinoma of O ary



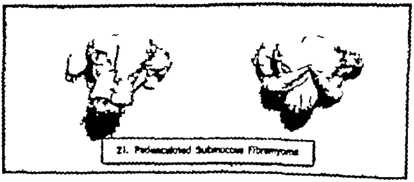
20 Thecoma of Ovary



9 Endome os



18 Papillary Serous Cystadenocarcinoma of Ovary

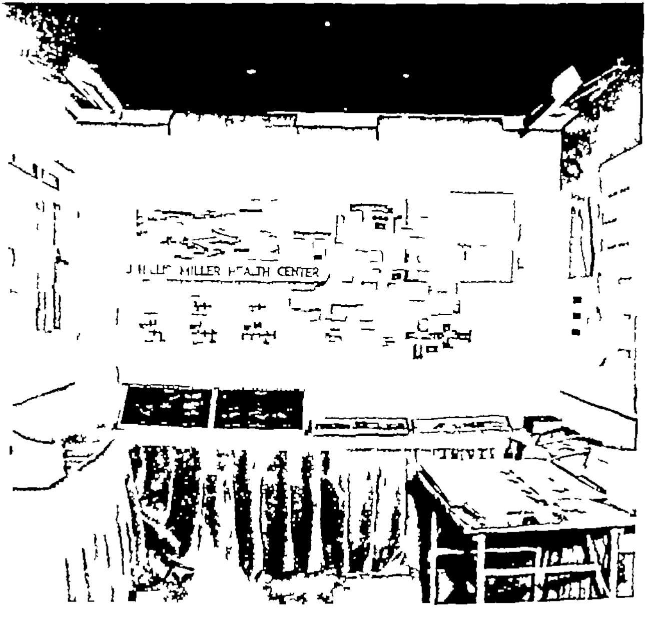


21. Pedunculated Submucous Fibromyoma

University of Florida Health Center: An Integrated University Approach.

George T Harrell University of Florida College of Medicine Gainesville Fla

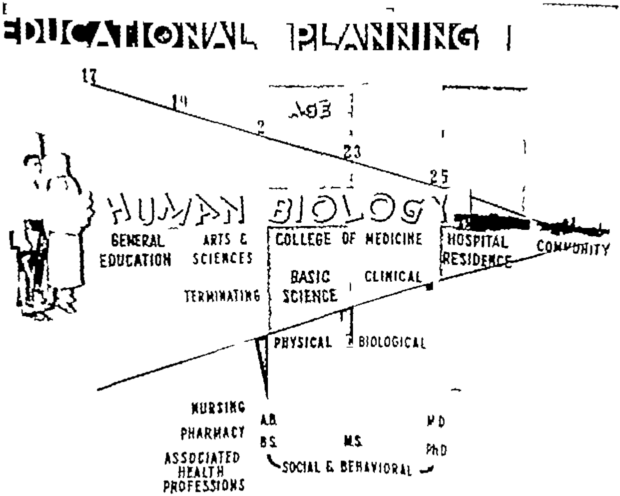
The xhibit shows architect' rendering of the completed physical plant together with small-scale floor plans of selected floors f the Medical Sciences Building and Teaching Hospital, illustrating the principles of architectural integration and the placement of the specific teaching and patient care facilitie which are unique to thi plant Photograph of the Medical Sciences Building, the individual study cubicles, teaching laboratories and other aspects of the architec tural solution are presented, together with maps of the distribution of population in the state, the arrangement of the road system in the county the campus plan, and traffic pattern on the site to illustrate the detailed long-range planning The U iversity-wide educational theme and how the basic educational program will develop into specific training programs, not only for Medicine Nursing and Pharmacy but for related technical facets of an over-all health program are hown.



THE EDUCATIONAL THEME

Human Biology has been chosen as the thread with which to weave the entire program of health education at the University of Florida A high school educat on and satisfactory completion of the two-year general education program of the Univers ty of Florida s University College are common backgrounds for all students of the health professions At the junior year the stud nt may choose a particular branch of Human Biology In the College of Arts and Sciences the College of Nursing the College of Pharmacy or the proposed College of Associated Health Professions (still in the stage of study) At the baccalaureate level the student nterested in a career in the health services again may choose from many alternatives with n the Un vers ty setting he may enter graduate programs in the colleges mentioned or he may enter the College of Med cine where he may pursue his particular interest – clin cal practice or research in the basic or cl n cal medical sciences

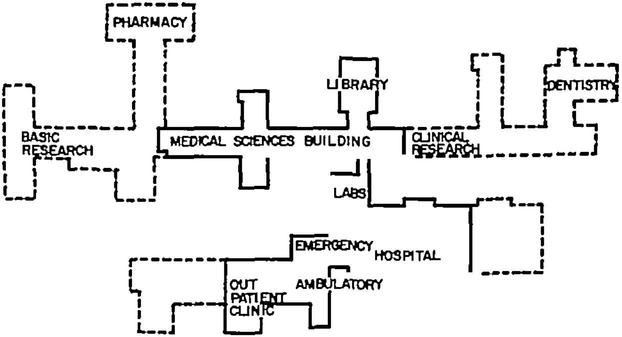
There are many areas at the advanced levels of education where nstruction can be interdisciplinary Students from var ous units of the Health Center for nstance medical and nursing students learn many techniques together In add tion the faculty both w th the Health Cent and from other



colleges of the University are exchanged to achieve integration within the Health Center and through out the University

THE PHYSICAL PLANT

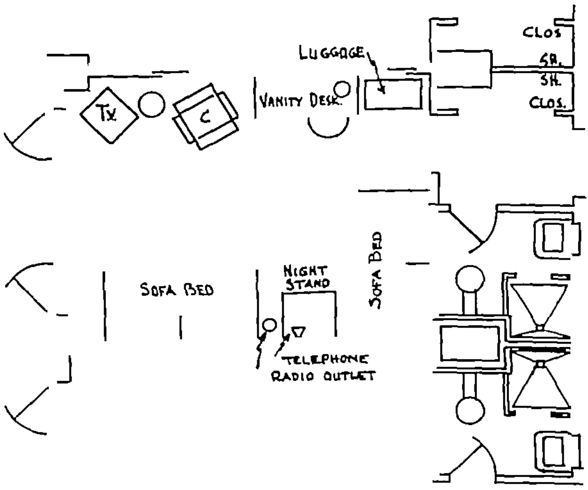
The Medical Sciences Building the first unit of the J Hillis Miller Health Center houses the Colleges of Medicine and Nursing and has been in operation since September 1956 The second unit the Teaching Hospital is scheduled for completion during the 1958 59 academic year It will provide within the University a comprehensive setting for the clinical training of the third and fourth year medical students and the practical training of nursing students as well as students in other fields associated with medicine such as physical therapy medical sociology clinical psychology and many others



It is in the Teaching Hospital that the health team concept has its fullest expression Facilities provided for rehabilitation and the ambulant patient facilities are designed as laboratories of applied human biology Any person in the University who works with human beings at an advanced level of educational training might work side by side with a medical student under competent supervision Training of all students in the Teaching Hospital will emphasize the importance of patient care not only in the hospital but in the home as well Here again there will be great opportunity for a blending of talents On each floor the elements of the home – bedroom kitchen bath and living room – are reproduced in a four-room apartment so that patients and families can be instructed in the proper methods of home care All of the elements of the home are also reproduced in the out patient clinic The facilities for patient education are so placed that the nurse medical student or house

officer the dietician physical therapist clinical psychologist or marriage counselor from other parts of the Center can meet the patient and family conveniently

Preparation for home care will be emphasized in the ambulatory wing of the Teaching Hospital The ambulatory patient whose stage of illness permits him to spend much of his time dressed and moving about may go to a central cafeteria for his meals Since he does not require constant bed side nursing care he will stay in the attractive hom like ambulant wing where a member of his family may stay with him and learn to administer medication or give him attention which otherwise would be given by the bedside nurse Thus the medical student visiting such patients in these surroundings will work in a homelike situation just as he will work in an office-like situation in the outpatient clinics At the same time the staff will have an opportunity to study the types of illness that can be satisfactorily cared for in the home or the physician s office



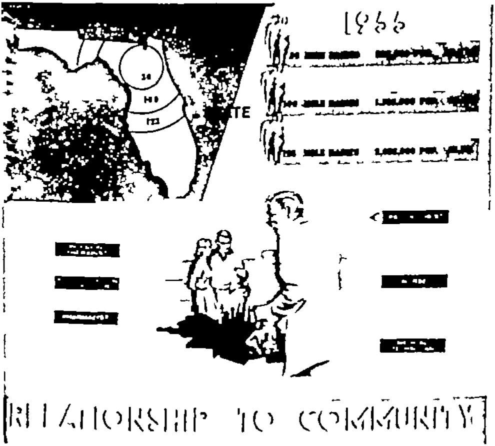
PLAN OF AMBULANT - 2 - BED ROOM

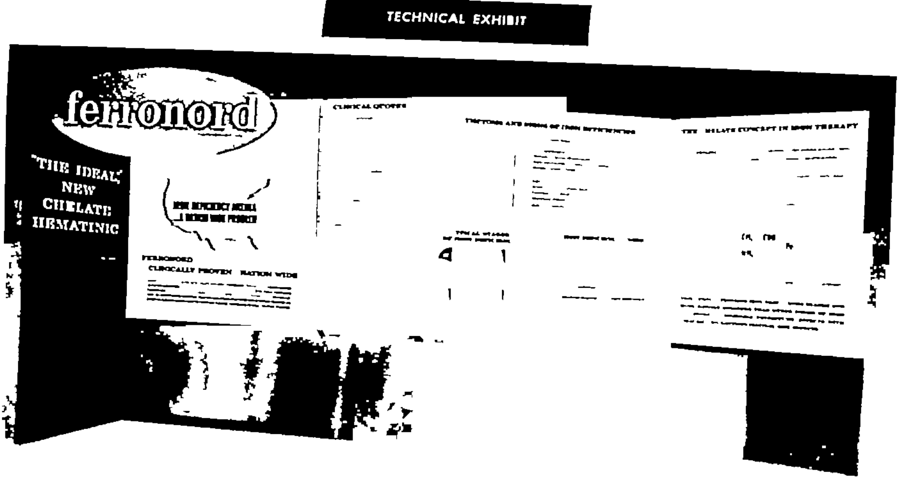
RELATIONSHIP TO THE COMMUNITY

Gainesville Florida was chosen as the site of the J Hillis Miller Health Center after careful consideration of the distribution of population in the state—within 125 air miles of Gainesville and within three hours driving time is 50 per cent of the population of Florida The road system has been constructed so that access to the Health Center is permitted from all directions without entering traffic through the town of Gainesville or the main campus of the University

As the University itself develops during the next twenty years the Health Center too will become more complete with additions of units for pharmacy basic and clinical science research the related health professions and perhaps dentistry

Finally we come as all educational programs must to service in the community If our program is successful and our objectives are met the physician entering the community will be armed not only with sound medical training but with an ability to communicate with its members He will have an eye not only to their physical needs but also to their social and psychological needs And he will be aware and appreciative of the team by his side—of medical technologists nurses physical therapists rehabilitation counselors psychologists pharmacists and many others It is in the community that the concept of a health team may become a reality and may work to achieve the goal of the University—to serve man in his entire being

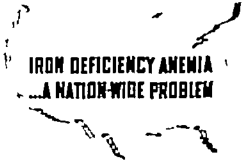




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"THE IDEAL," NEW CHELATE HEMATINIC



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CLINICALLY PROVEN NATION WIDE

[illegible]

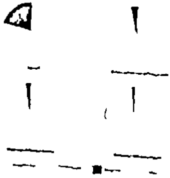
SYMPTOMS AND SIGNS OF IRON DEFICIENCIES

[illegible]
[illegible]
Loss of appetite and weight
[illegible]
[illegible]
[illegible]

Pallor
[illegible]
[illegible]
[illegible]
[illegible]

CLINICAL QUOTES

TYPICAL STAGES OF IRON DEFICIENCY



IRON DEFICIENCY ANEMIA

TECHNICAL EXHIBIT

THE CHELATE CONCEPT IN IRON THERAPY

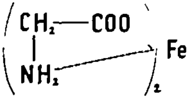
CHELATES products formed by the interactions of [illegible]ertain substances, particularl[illegible] proteins, which bind metals and [illegible]esult in the formation of new chemical entities

Chelates vary considerably from simple mixtures of the components in respect to their physical and chemical properties

Chelation may make [illegible] metal more soluble

Chelation may make [illegible] metal more readily diffusible through membranes

Chelation can either inhibit or activate those physiological actions in which the metal participates catalytically



AN INVESTIGATION OF THE CHELATION PROCESS AS RELATED TO IRON LED TO THE DEVELOPMENT OF

FERRONORD alpha aminoacetic ferrous sulfate complex exsiccated

THIS COMPLEX PROVIDES IRON THAT IS MORE READILY AND MORE RAPIDLY ABSORBED THAN OTHER FORMS OF IRON AND PRODUCES DESIRABLE THERAPEUTIC EFFECTS WITH VIRTUALLY NO GASTROINTESTINAL SIDE EFFECTS